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THE

Dental Summary

EDITED BY
L. P. BETHEL, M. D., D.D.S.
COLUMBUS, OHIO

VOL. XLI

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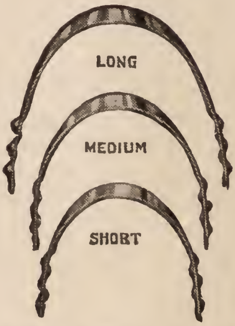

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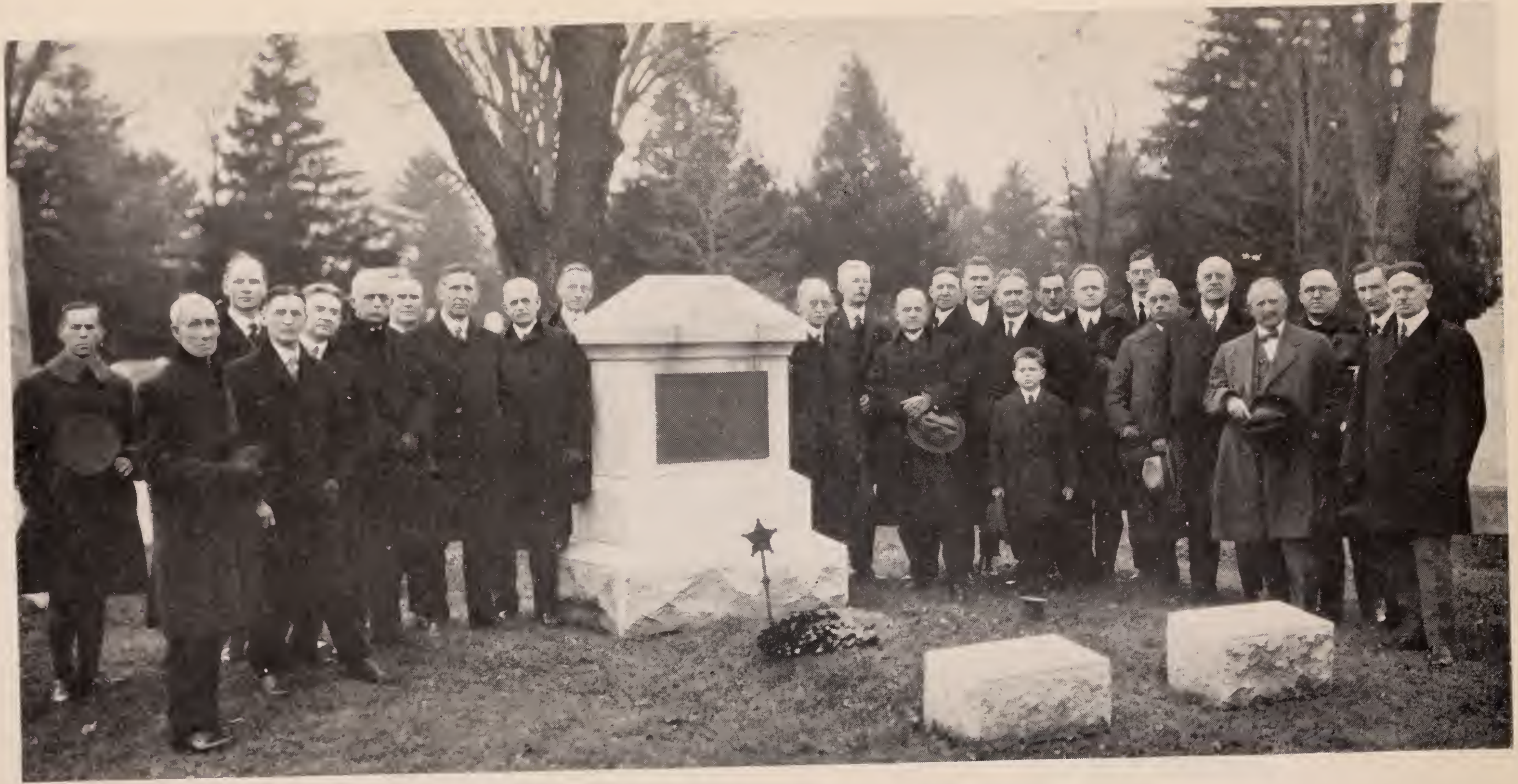

In Memoriam—Frederick Henry Rehwinkel

Born June 15, 1825—Died June 8, 1889

Unveiling of Monument and Memorial Tablet to Frederick Henry Rehwinkel, M. D., D. D. S., at Chillicothe, Ohio, Nov. 29, 1920, by the Ohio State Dental Society, Rehwinkel Dental Society, Grand Army of the Republic and Masonic body of Chillicothe, Ohio

REGULAR CONTRIBUTIONS

THE DENTAL SUMMARY
THE MAGAZINE THAT HELPS

Vol. XLI January 1921 No. 1

SAFE AND SANE DENTISTRY*

BY PERCY R. HOWE, BOSTON, MASS.

ASSISTANT PROFESSOR OF DENTAL RESEARCH, HARVARD UNIVERSITY; CHIEF OF RESEARCH LABORATORY, FORSYTH DENTAL INFIRMARY FOR CHILDREN.

A FEW YEARS AGO there would have been no need for a paper upon the subject of safe and sane dentistry. Dental writings and discussions then had to do with theories and practice that concerned the teeth themselves. It was assumed that the teeth were a necessary and important part of the human system, inasmuch as nature has seen fit to provide a large part of the animal kingdom with them. We are now told by some of those that are wiser than Nature, that the teeth are mere mechanical and cosmetic things. We are told that much of our constructive and restorative work has been worse than useless; that it is positively dangerous to the life of the patient. Especial diseases are enumerated as arising from the teeth. The list is too long to insert here, but it is a very elastic one. Fallen arches, insanity, kidney trouble, heart trouble, appendicitis, gastric ulcer, are a few of the diseases listed. Very many others are specifically named. We had supposed that such widely divergent diseases were due to as widely different causes, but it seems that the cause of fallen arches and of insanity is the same, viz., the teeth. Just why the trouble runs to the head in some cases and to the feet in others is not wholly clear. Then there are the heart, kidney, stomach and appendix, all of which are in imminent danger of permanent injury. The trouble in the teeth is apt to strike any one of these parts, and does, we are assured.

Just how these serious and often fatal results occur we are not told, but we are asked to accept the theory of elective localization as a partial explanation. According to this theory, a micro-organism elects to set up a disturbance in such new parts of an animal body as correspond exactly to the parts of the animal from which it was originally taken. So far as the teeth are concerned, then, tooth trouble begets tooth trouble, and nothing else.

It is apparent to any one who has even an elementary knowledge of such widely different diseases as we have referred to that, to expect to find a common cause for all is certainly most extraordinary. Some are of infectious origin, others are not; but so far as the infectious view of disease is concerned, one micro-organism usually is held responsible for one disease. The action is specific. There may be several secondary invaders, but only one primary. The Klebs-Loeffler bacillus causes diphtheria. Diphtheroids, which are very similar in appearance and are frequently present at the same time, appear to have no pathologic effect. Typhoid bacilli, not colon bacilli, cause typhoid fever. Shall we then attribute all these various diseases which are supposed to follow the

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*Read before the Northern Ohio Dental Society, June, 1920.

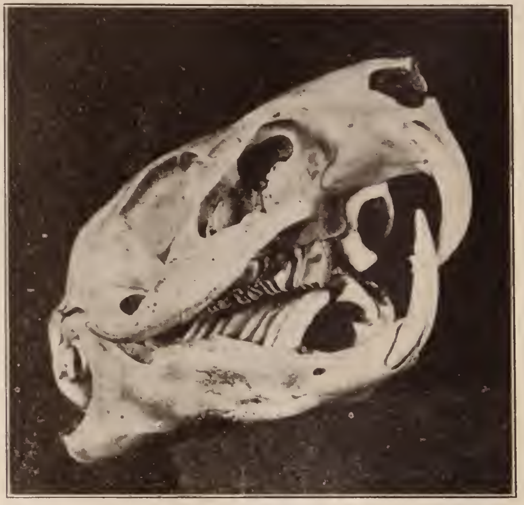

Fig. 1—Decalcification of the teeth with distinct bending. The lower first molars nearly touch across the jaw; the result of vitamine deficiency.

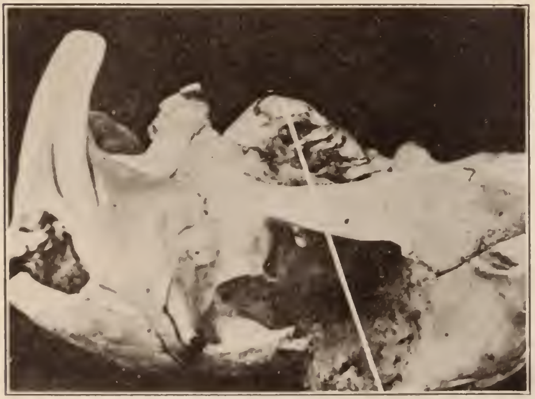

Fig. 2

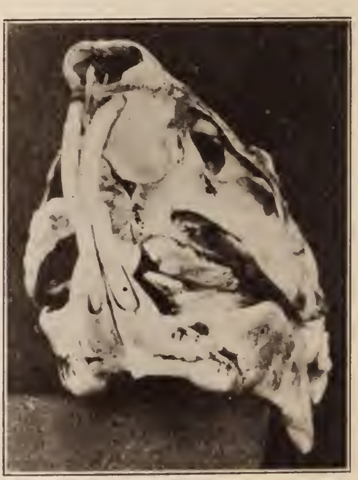

Fig. 3

Fig. 2—Decalcification of the tips of the molars.
Fig. 3—Softening and decalcification of the molars, produced by diet.

presence of a dental abscess to one micro-organism, and that micro-organism one which is present in food, drink, the air, the dust, and in all healthy mouths?

It is the streptococcus viridans, so-called, that is supposed to be the cause of all these diseases. The mere presence of this micro-organism is conclusive evidence to the exponents of this theory that the cause of the disease has been found.

Its presence in a blind dental abscess, and in, for example, a diseased kidney, convinces them that the dental abscess causes the kidney trouble.

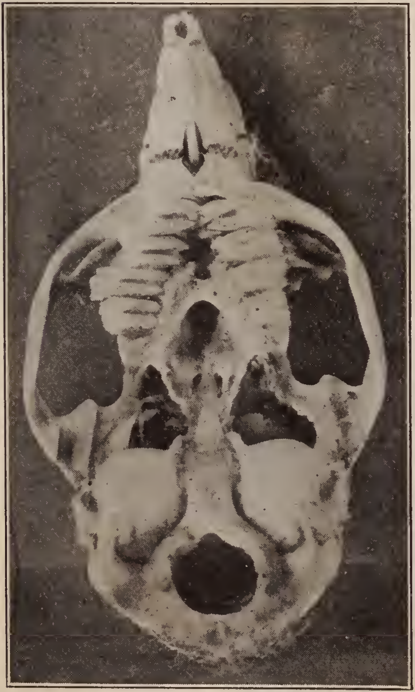

Fig. 5

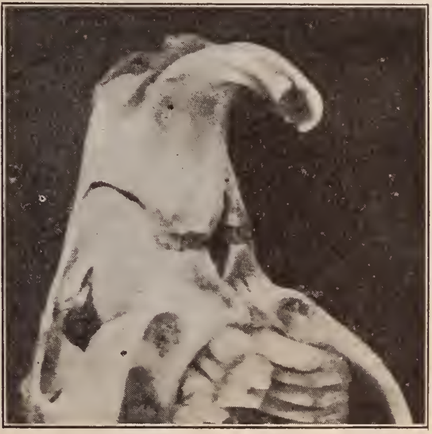

Fig. 5

Fig. 4—Distinct cavities in incisors; the result of vitamine deficiency feeding.
Fig. 5—Cavities in incisors.

On this basis it is equally reasonable to conclude that the kidney trouble causes the dental abscess. The reported findings of streptococcus viridans in different areas, with an idea of establishing a connection between them, are very questionable. In respect to this Krumwiede says: "The deduction that the cultivation of streptococcus viridans from a focus is proof that the local focus has been found, is a source of error. Moreover, streptococcus viridans is not a specific micro-organism, but a group, heterogeneous in character, and not a distinct type like the typhoid bacillus, all of which are alike." Indeed when we find an abscess, staphylococci usually are found. As a rule the streptococci of this variety are not found, or at least are not supposed to cause abscesses. The mere presence of the streptococcus viridans is not evidence of its etiological relationship to the disease, for it is present in healthy mouths from youth to old age. It is only suppressed in the mouth in the case of a definite disease when the type of micro-organisms associated with that particular disease predominates, and remains usually for about ten days after the abatement of the trouble, whereupon the normal mouth flora, including the streptococcus viridans returns.

By certain cultural methods it is possible to show that perfectly normal internal organs contain microbic life. Hartzell states that in the pulps of, I believe, thirty-seven sound teeth, about twenty show infection. This does not signify disease. In the entire animal kingdom no such thing as bacterial sterility exists. There is no such thing as a sterile mouth, nor has Nature intended that there should be. The general or local invasion of the system by the alimentary microbic life depends upon governing factors which are not wholly understood. A previous preparation of these parts is necessary for their parasitic growth. The modifications which occur in bacteria by alterations in the media, suggest that tissue conditions and proper tissue functioning are the practical things that control the proliferation or suppression of the omnipresent bacterial life of the kind under consideration.

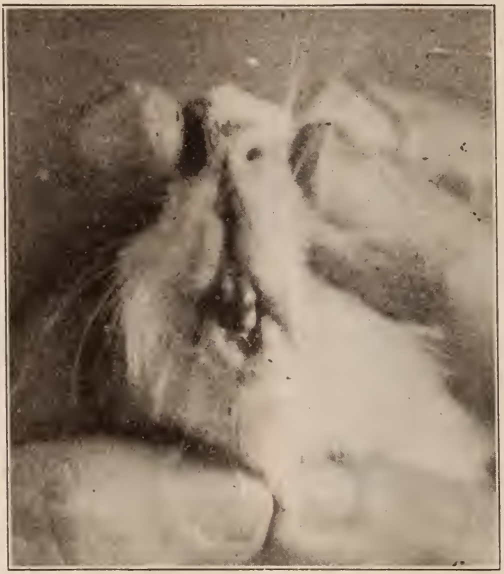

Fig. 6—Caries in living animal produced by vitamine deficiency feeding. No effect could be obtained by following Miller's theory.

In the experimental work that is used to support this theory, young animals, intravenous injections and massive doses are used. It is replied to the criticisms, that these doses are excessive and do not fairly represent what occurs in the human body, that at times ("at times" is not often or always) it is possible to produce the desired pathological effect with smaller doses. Proportionate doses for a man of seventy kilos, or one hundred and fifty-four pounds, would range from a cupful to ten quarts. Even a cupful would seem to be a respectable dose for a man when one considers that it is to be injected into his circulatory system. Pure cultures are not injected. The granuloma, the abscess, pyorrheal pus or the pulp are dropped bodily into ascitic-dextrose broth, allowed to grow, and the broth containing all this complex and decomposing material is then injected (forced) in overwhelming doses directly into the ear-vein of a susceptible animal. He is killed at the proper time, for if let alone a reasonable time he will recover even from such a dose. Micro-organisms are then found in the different tissues. Why should they not be, when they have just been put in? You take out of the hat

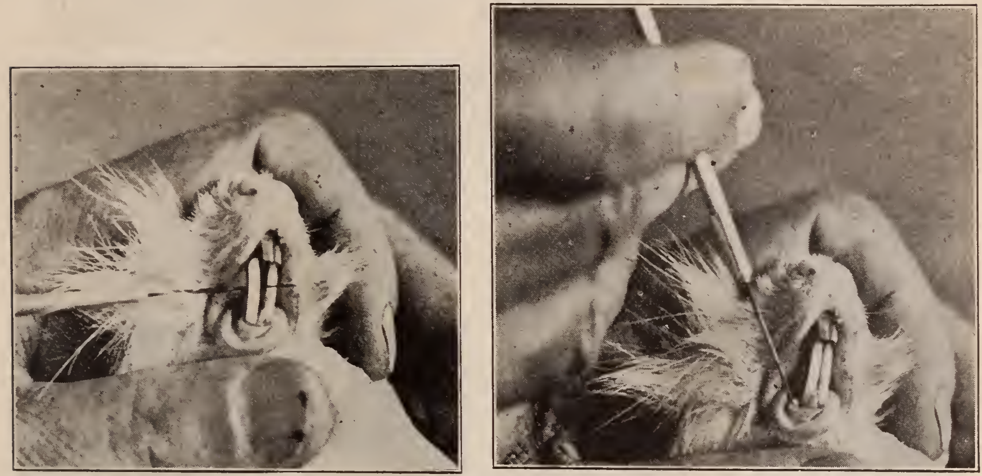

Fig. 7—Looseness of teeth produced by diet; also shows depth of pocket.

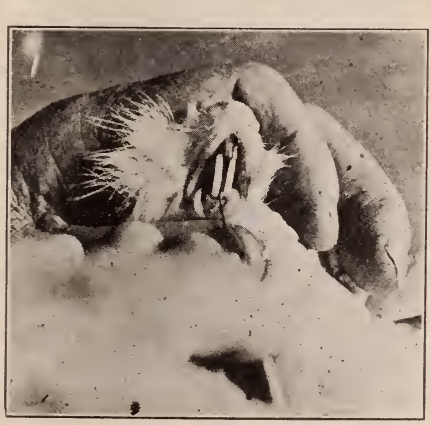

Fig. 8—Looseness similar to pyorrhea.

what you have just put into it. If it was a dye that had been injected it would show in the dentin. Even such a dose may only at times produce a pathological effect.

Another objection raised by the opponents of the theory is that intravenous injections are necessary to give the desired results. To refute this objection, and to represent more nearly what occurs in a focus of infection, that is, to demonstrate that the bacteria may pass through tissue, massive doses are given intraperitoneally. Again, only at times is it possible to produce effects. Now we do not often deal with doses ranging from a cupful to five or six quarts from dental sources. Yet, to produce such results as are described, they must be used. In the small dose of a cupful of micro-organisms, together with the other putrefactive products mentioned, occasionally an effect is obtained. No attention is paid to the physiological effects produced by the introduction of such a quantity of foreign material into the circulatory system —notice is taken only of the streptococci present. Others have inoculated rabbits with ten to fifteen cc. doses of streptococci of this type for three months, and have obtained no results.

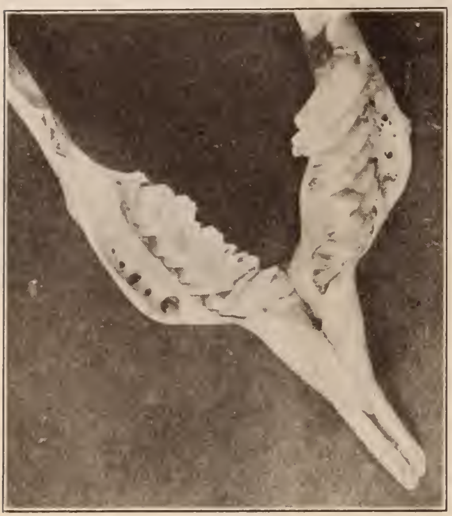
Fig. 9

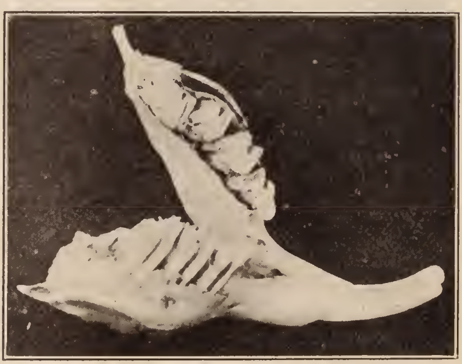
Fig. 10

Fig. 9—Destruction of alveolus with looseness of teeth.
Fig. 10—Alveolar loss with looseness of teeth.

Most writers agree that this type of micro-organism is, in the commonly accepted meaning of the term, non-virulent, or of an extremely low order of virulence. Rosenow, however, extends this meaning of the term to include organisms which, as he puts it, "Tend to lodge and produce lesions in the tissues or organs of animals corresponding to those involved in the patient from whom the culture is taken." Hence the necessity for a direct and uninterrupted route. Hence also the need for enormous doses. These requirements are hardly met with in dental troubles, as is obvious to any one who understands dental diseases. The route of entrance into the system is not direct for the micro-organisms. They meet impediments at every turn. The white cells and other phagocytic cells meet them and digest them. The blood assists in this action by agglutination, by bactericidal and opsonic properties. Should they succeed in overcoming these forces of protection, the fixed tissue cells dispose of them. Through the lymph stream they meet a similar fate, for by the cells they are carried to the lymph glands and there digested. The object of a separate lymph system may be, as Mathews points out, to guard against infection. Augmented immunizing forces are created if needed. The system is well protected. This never is to be lost sight of in considering highly experimental and speculative theories. One interesting experiment showing the ability of a single organ of the system to dispose of infection is that of liver perfusion. If a heavily-infected material is perfused through the liver it comes out sterile.

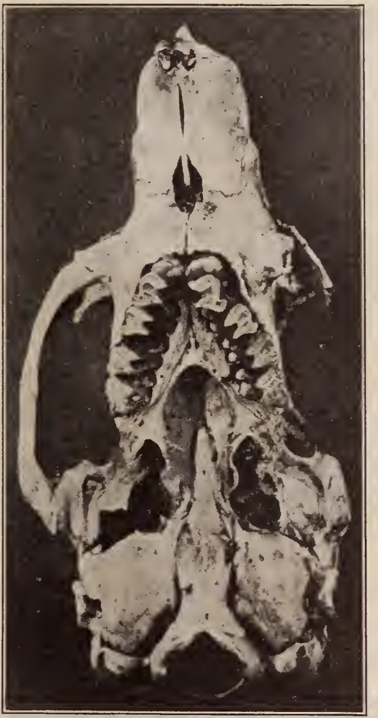

Fig. 11—Condition similar to pyorrhea.

Now all these effects produced by such animal experimentation may be produced with more regularity and in a higher percentage of cases by other means. For example, in experiments on gastric ulcer, Mann, by removing the adrenals, produced it in ninety per cent. of his cases, as against forty per cent. claimed by Rosenow. Carlton and Jacobson produced gastric ulcer in seventy-five per cent. of their cases by removal of the thyroid; Elliot also by removing adrenals; Friedman by thyroid removal; Celler and Thalhimer studied experimental gastric ulcer and *could not be sure that these effects produced by bacterial injection were ulcers.* These lesions heal quickly. Ulcers are common in laboratory animals that have not been treated. Injection of pilocarpin and adrenalin produces gastric ulcers. They may be produced by mechanical and chemical means.

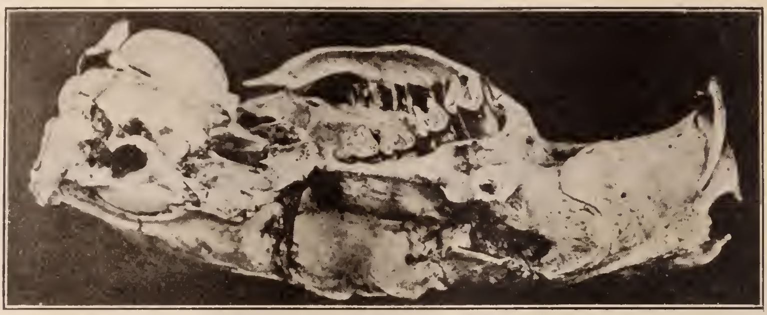

Fig. 12—Elongation and looseness.

As far as arthritis is concerned, it may be produced in many ways. In my studies upon nutrition I have found, as have many others, that animals upon vitamine-deficient diets become exceedingly rheumatic. Their joints become swollen and sensitive. The legs are malposed and crippled. They lose the use of their hind legs, and drag themselves painfully about. A correction of the diet will be followed by a complete recovery, if the treatment has not been too long continued. Dr. Nathan in his work upon arthritis relies for treatment upon a nutritional rectification. In many of our arthritic hospitals complete recovery followed nutritional correction in many cases before the infectious idea was suggested.

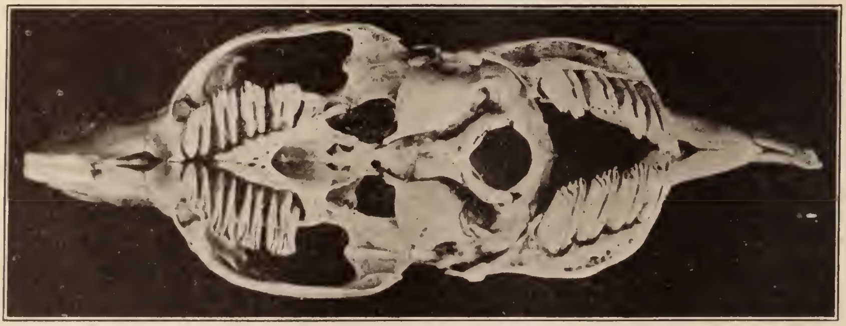

Fig. 13—Great loss of alveolar structure.

It is difficult to show micro-organisms in sections of granulomas. Dr. Rosenow cultures these sacs for several hours before he sections them. This mass of tissue is removed from the body and from all its vital and protective forces, which are fully as potent as the infective factors. By artificial means, by dead enrichment material, the latent and inert microbic life in this mass is incited and stimulated to a prolific growth many thousand times that which actually occurs in the body, and *this* is portrayed as the existing condition!

The granuloma is a circumscribed sac of cicatricial tissue. New vessel formation and granulation tissue mean repair. The existence of a granuloma is supposed to be unknown until revealed by the X-ray. The inflammatory condition has passed. There exists no pain, no rise of temperature nor any local indication of disturbance. It is the result of previous inflammatory disturbance, due to chemical and mechanical trauma that has accompanied our root-canal procedure. It must be remembered that the sections of these neoplasms used for illustration purposes are from excessive and unusual cases, often in an active state; they are extremely small abscesses. Microscopic examination of the tissue simply shows granulation, resolution, healing. These sacs are attached to the root ends and are removed with extraction. They may undergo fatty degeneration as shown by fat stains and by cholesterin crystals; they frequently calcify. To choose between two examples, although they are like neither, they are rather to be compared to a small benign tumor than to an infective area. They are as a rule minor, and comparatively harmless things, and in no way to be regarded as the cause of grave systemic disorders. The adjacent sound structure never is attacked. It is only about pulpless teeth that they occur. They may cause a local vascular and nervous disarrangement that may be reflected in the adjacent anatomy. Should they assume an appreciable size or give clinical signs of an active local disturbance, cure them or remove them by all means.

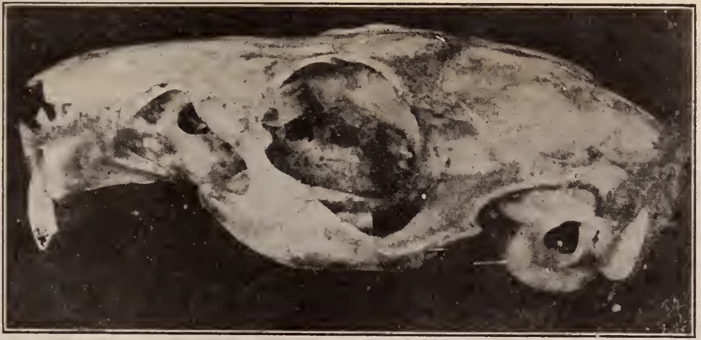

Fig. 14—Caries in orbit at base of molars; effect of vitamine deficiency feeding.

As a part of the focal theory of infection we hear much about "points of entrance." The human body is not covered with hermetically-sealed integuments. A better conception is that the tissues are filter or ultra-filter systems. No one pays any attention to points of entrance in the case of ordinary disease. One merely comes into contact or into close proximity with diseases that are of an infectious nature and the disease is acquired. Micro-organisms may enter into the system through the nasal mucosa, through the intestines and in other ways. From the standpoint of disease "points of entrance" loses much of its meaning.

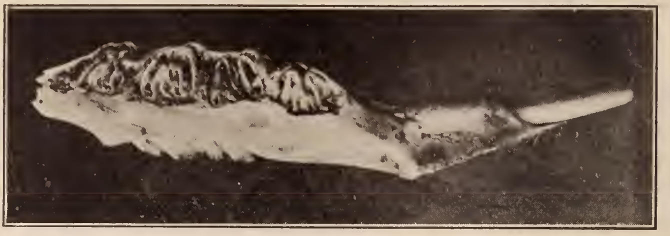

Fig. 15—Loss of bone at base of jaw exposing molar roots.

An immense amount of work has been done upon the classification of the streptococci. Brown has given a classification which has been edited as a monograph by The Rockefeller Institute, in which he suggests their being termed as A, A', B and G, these being refinements of the usually accepted term hemolytic and non-hemolytic, the distinguishing characteristics being based upon their ability to digest blood. The non-hemolytic to which the viridans belong do not digest blood, while the hemolytic do. The hemolytic are distinct disease producers; the cause of milk epidemics, the virulent disturbances that follow pneumonia, etc. The non-hemolytic, on the other hand, only act in areas in which the resistance has been lowered. As Kinsella puts it, "Even in the case of subacute bacterial endocarditis, where this type of micro-organism is constantly found in the blood stream, its appearance upon a previously-injured heart valve seems purely saprophytic." The non-hemolytic are heterogeneous. At one time or another streptococci have been thought to be the cause of many diseases, such as small-pox, tuberculosis, scarlet fever, whooping cough, etc., only to be proven secondary invaders. If

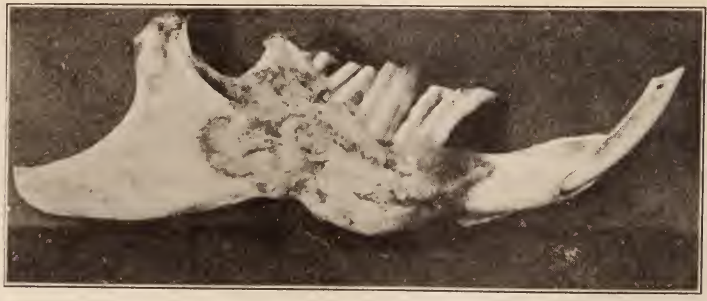

Fig. 16—The darkened area shows decalcification followed calcification; the effect of abnormal diet followed by normal feeding.

it were true that micro-organisms found their way into the system constantly and not in overwhelming doses, nothing else than an acquired and increased immunity would occur. It is well know to surgeons that persons have carried, and for a long period, large amounts of pus in their systems, often a liter, without other seeming harm than the mechanical disarrangement of the parts. When the principles of immunity are applied to the non-hemolytic organisms it is found that they do not work out properly. Dr. Rosenow suggests that they be revised. Wherein lies the trouble, in the known, tried and proven principles of immunity, which apply not only to bacteria but to cells, toxins, foods, proteins, or in this theory? The intricate compensating forces of the system for neutralizing acids or morbid products of every description cannot be disregarded.

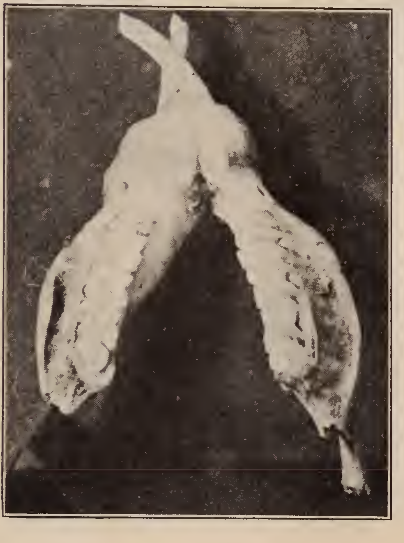

Fig. 17

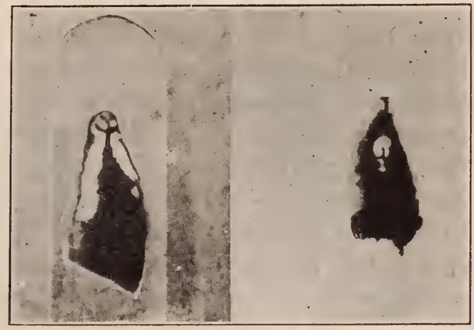

Fig. 18

Fig. 17—The incisors were originally perfectly regular. Deficient feeding produced softening of the jaw. The muscles then crossed the teeth. A return to normal diet was followed by recalcification which fixed the teeth in the position shown.

Fig. 18—Shows multiple foramina and two pulp canals meeting into one outlet.

If the advocates of this theory would be willing to concede that micro-organisms of this type are secondary invaders as has been proven in all other diseases, then the involved, intricate and elaborate explanations used to support it would be unnecessary. The question of localization would be settled. The question of special tissue affinities could be discarded. The tissue condition would then be the governing factor. These micro-organisms would be found in areas of lowered resistance. If they attain peculiar properties they would come from the tissues of the parts in which they have actively grown. The laws of immunity would not have to be altered. Change the theory, it will fit the principles of immunity.

While these theorists are perfectly ready to tell about secondary and remote effects, they never explain the primary effects, or why the tonsil or tooth becomes infected in the first instance. If streptococci of the viridans type are the cause of the dental abscess or of pyorrhea, and either they are the cause or they are not, all that remains to be done is to inject them into these perfectly accessible parts and the disease is established. But when this is done, and many have tried it, only spontaneous healing occurs. A child falls down and strikes his tooth a sharp blow. The pulp dies; cultured, it shows infection. It has had no external communication. The tooth may become sore and an abscess form. What is the cause of the infection? The cause of the trouble is the blow, mechanical trauma. The infection is a secondary matter. Arsenic applied to dentin will in time kill the pulp. What is the cause of the infection? It is chemical trauma. It is only in pulpless teeth that abscesses occur. Just as these micro-organisms act in primary areas so they will act elsewhere. And the conditions being locally right, infective areas will be found, teeth or no teeth. The tissue condition again is the governing factor, not the microbic life.

Fig. 19

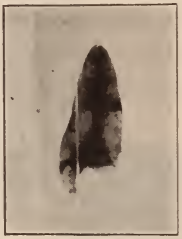
Fig. 20

Fig. 19—Molar root with multiple foramina leaving root at one side.
Fig. 20—Root with lateral canal half way up.

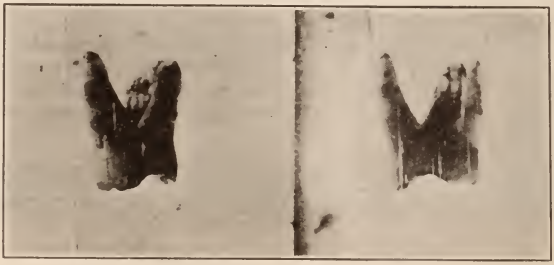
Fig. 21—Molar root with two canals and anastomosis.

But suppose for a moment that this theory is clear and direct, and that it needs no modification and finely-drawn explanations to support it. Suppose that the identity of a strain of viridans has been established beyond question, and that it is found in a blind abscess, for example, and also that without any reason whatever, except elective localization, it has wandered along without let or hindrance through the blood stream or lymph channels and located in a joint. There it has established itself, and of course it must have originally in some manner not described have come from a joint, else it would not go back to the joint, on account of its elective properties which it acquired in its first residence there; but being firmly established it has caused much joint trouble, pain, soreness and stiffness. None of the symptoms were noticed in the blind abscess, for its existence never was suspected until revealed by the X-ray. How do you expect to relieve the joint trouble? By the abscess removal? They are independent processes, are they not? The joint trouble is exactly as much a focus as the dental abscess, and may go on if this principle is correct and start as many more independent foci. So many, in short, that to attempt to eliminate them by the knife is to eliminate life.

It has been reported that clinical results support this theory. I have made an effort to find out the truth of this. I have been in practice nearly thirty years, I have been in close association with large clinics, hospitals and laboratories, and from all sources have not been able to see that the elimination of dental areas of disturbance have brought about any such effects as have been expected or as are commonly reported. I have, however, seen great harm done. In the large clinic at the Forsythe I never have been able to detect anything that would support this theory, based upon the streptococcus viridans. An occasional effect is seen following the removal of an impacted molar, but this is a profound vascular and nervous disturbance of a mechanical origin. The removal of a number of useless and diseased teeth, and the substitution of a plate often improves the general conditions. This is mainly due to the ability of the patient to perform, perhaps for the first time for years, the first act in alimentary digestion. I have seen an increase in weight of thirty or forty pounds in three months in a patient by merely grinding off the corner of a crown, thereby restoring a normal

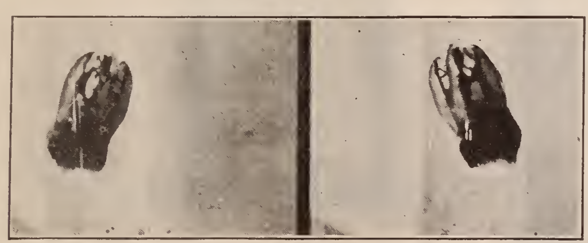

Fig. 22

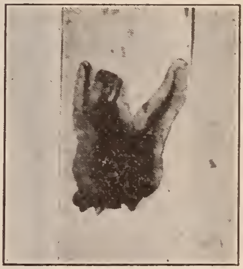

Fig. 23

Fig. 22—Anastomosis in a pulp.
Fig. 23—Multiple foramina.

occlusion. A great improvement in nervous condition also followed. In reply to a statement that I had found no arthritis deformans that could be attributed to the teeth, Dr. Rosenow replies that children do not have this trouble. I am not so sure of that, but they do have granulomas and blind dental abscesses by the thousand, and if these are the cause of arthritis why do the children not have it? Cases of rickets and of rheumatic hearts exist here, but I never have been able to see any evidence whatever that an abscessed tooth could be considered the cause of these rheumatic conditions. There are occasionally children who are mentally deficient, but the idea that the teeth cause insanity is preposterous.

We are now going through an era of destructive dentistry. I believe in constructive dentistry. If an eye had a condition that was considered infective, would you extract it? An infected tooth can be cured, irritation can be overcome. Roots can be successfully treated. The amateur radiographist has proved to be a questionable asset to dentistry. You cannot tell infection by the X-ray. You cannot tell pus by the X-ray. You can distinguish light and dark only.

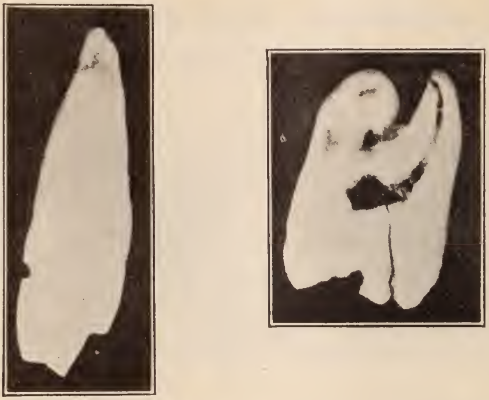

Fig. 24—These are sound teeth from patients twenty-two and twenty five years of age respectively. The dental structure is white, opaque and uniform in appearance.

The teeth are necessary factors in nutrition. Once lost they never can be replaced. The first act of digestion gone, the rest must be carried out under stress by the digestive tract. Every intelligent effort should be made to save the teeth. Clear up all diseased areas of course. It may be that in certain rare cases a very extensive infection about the teeth, one such as no modern dentist ever would allow to occur in his private practice, would have a general effect upon a person who was physically below par, but such an oral condition would not be the cause of his being below par, but a sequence of it. If we consider dental diseases, such as pyorrhea, and some of the effects ascribed to it, from a nutritional and functional standpoint, we shall be nearer the real cause of our troubles than if we consider these solely from an infectious point of view. We are at present suffering from a professional neurasthenia. Every mole-hill seems a mountain. We eliminate all other factors, such as normal living, a good, sane diet, rest, fresh air, nervous disturbance, high-tension living, and see only the infectious. Let us hope that dentistry will maintain its sense of proportion, its equilibrium, and take a sound, broad and comprehensive view of the problems of physiology and of disease before the present ruthless sacrifice of teeth extends further. The teeth are a necessary part of the body. The disturbances about the teeth are as amenable to treatment as is any other part of the body.

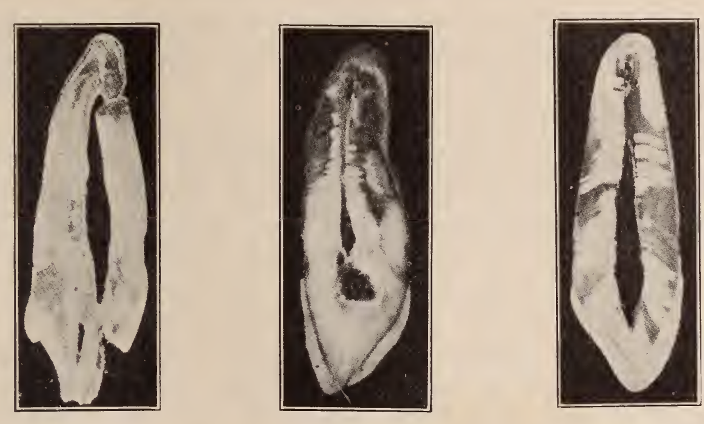

Fig. 25—Structural alteration that follows pulp or pericemental disturbance.

Clean up all diseased areas, avoid chemical, mechanical and surgical trauma. Do not regard every difference in light and dark as revealed by the X-ray as a sign of disease. Many of these areas are cicatricial tissue and have already been taken care of by nature. Clinical signs are to be regarded first. Make an intelligent effort to save all teeth.

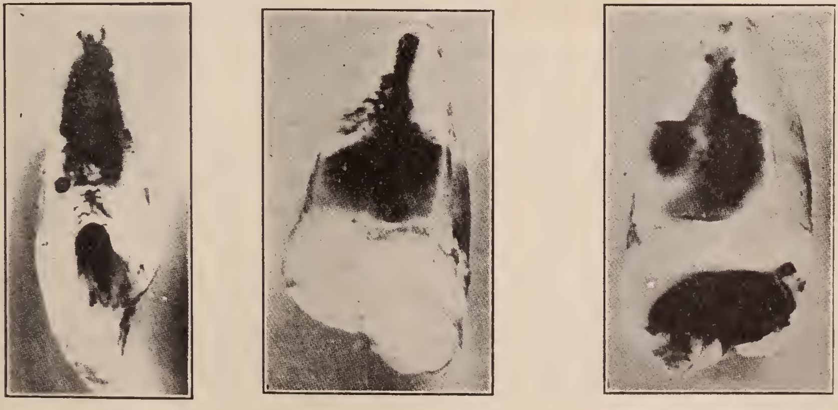

Fig. 26—These teeth were treated in the mouth and then extracted. The sides were ground off and the penetration of the silver is shown. The healthy tissue is not penetrated, but the unsound structure is.

Do not regard all bacteria as disease producers. Look to tissue conditions as the controlling factor. Persons with no teeth have these general diseases fully as much as people with teeth.

PRACTICE

It is most important of all to understand as accurately as possible how dental pathological conditions occur, and to take early measures to prevent their occurrence.

I have elsewhere given accounts of how conditions similar to pyorrhea and dental caries may be brought about in small animals. These experimental results indicate that both of these dental disturbances are due to nutritional disturbances. There is not the space here to go fully into this subject, but the illustrations show quite clearly the dental effects produced by deficiencies in the food accessory substances.

First of all in practice, oral hygienic measures are to be highly recommended on the same principle of cleaning up any diseased area. All debris of whatever nature should of course be removed, and the accumulation of such material prevented by constant hygienic care. Stimulating and detergent washes should be used to keep up the vigor and resistance of the oral tissues. Massage of the gums prevents circulatory stasis, and is beneficial. The next preventive measure for caries is the application of the solutions that I have described for reducing finely-divided metallic silver into any tooth defect, however minute it may be.

When fillings are necessary I believe that on account of the depth of decay it is impracticable to attempt to remove all the affected dentin. An examination of ground sections of decayed teeth shows the depth of penetration of the decay. It is further shown by an examination of the tooth substance from the bottom of cleaned cavities, for here a bacterial growth may be obtained if the tooth shavings are cultured.

It is good practice to make good cavity edges, to excavate as little as possible consistent with filling retention, and to sterilize the cavity bottoms. If silver is reduced into cavities the tooth is sterile and all affected dentin stopped by the finely-divided silver. The removal of a filling after this treatment sometimes will show that the cavity bottom has become hard and dense. Other means may, however, be used. A temporary filling of zinc oxid and eugenol will quite effectually sterilize dentin in about a week if the mass is not great. The application of carbolic acid for five minutes, followed by the application of seventy per cent. alcohol for five minutes, also sterilizes a cavity that seems clean to the eye.

When caries is deep the call for such treatment is imperative. Each pulp has individually constructed its own dentinal covering. Nothing else can be as perfectly adapted to it or substituted for it. Sterilize this decalcified dentin, and avoid all pressure in the reparative work.

Pulps should be capped. The pulp is the formative organ of the tooth. It is highly vascular, and therefore intimately connected with the resistance and health of the tooth. It is for the same reason capable of disposing of infection, and its tissue is as readily repaired as any tissue. Place a paste of zinc oxid and eugenol over the pulp, avoiding all pressure; then reduce metallic silver into the outlying affected dentin, and in the large majority of cases the pulp will live. Out of a thousand cases so treated there have been but eighteen return with trouble after two years at the Forsyth Dental Infirmary clinic.

When the pulp is dead, or its destruction is indicated, there are a number of things to consider in the subsequent treatment of the tooth. This one thing we have to remember, that the binding material of the tooth is organic matter. All the inorganic material may be removed from a tooth and its form is still retained. Destroy all the organic matter in a tooth and it crumbles to pieces. It is the organic substance that decomposes; upon this the bacteria grow. The pulp itself, in a large percentage of teeth, has a number of foramina. These themselves are frequently divided. They may enter through the tip of the root, or at one side; they may take a turn at an exact right angle. Examples of this are best seen in the illustrations. It is obviously impossible to properly clean a canal with a broach. The dentinal structure itself also needs treatment. Scientific canal work calls for chemical treatment, and it is for these reasons that I have advocated the use of silver reduction method. Dr. Box has emphasized the fact that the apical third of a root is intimately connected with the living tissue that envelopes the root. This means that roots may be retained, that nature not only tolerates them but supports them. Pass no instrument or foreign material through a root canal.

A dental abscess is also as readily treated as is any abscess. The principles for treatment are also the same, viz., drainage with curettement or washing with a solution like Dakin's.

In pyorrhea the local treatment is surgical. Attention to articulation must be given. Stimulating and detergent measures also must be employed. The general treatment must be governed by a study of the individual case. Teeth that are beyond saving should as a last resort be removed. Replace missing teeth with artificial substitutes.

This it seems to me constitutes safe and sane practice. The dentist, not the physician, should be the judge as to which teeth are to be retained. Nor should we allow the teeth to be made the scapegoat for all the many diseases about which no one knows much. The ability of the bony tissue to regenerate when proper root treatment is followed, and as shown by the X-ray, would be an instructive theorem for every physician to see.

199 Marlborough St., Boston, Mass.

DISCUSSION

Dr. Weston A. Price: I have tried to put myself in the position of the members of the dental profession who are trying to find some safe foundation, and it looks as though the foundation were poorly established. And I want to make this appeal to you: Because there seems to be a difference of viewpoint, do not lose faith in the sincerity of the men who are doing the work. And, more—the facts presented by various men are generally true, although their interpretations of them may be wrong. We must look upon these various contributions as being part of the great final chapter, the writing of the book, which we cannot interpret until we get some chapters not yet written. It may be that Dr. Howe and Dr. Hartzell and myself are approaching a fundamental truth from different viewpoints, but my appeal is to keep in mind that ultimately, truth will not contradict itself.

I think I see pretty largely where the difference in viewpoint comes between Dr. Howe and myself. Dr. Howe's work is intensive, and it is laboratory in nature, and he is seeing groups of well people coming and going in the Forsyth Infirmary. Dr. Hartzel might be in my position; we are seeing more than our share of sick people. Each of us may get a distorted view because we may think that what we see is the majority.

Another thing that should be kept in mind is, that those of us who are undertaking to interpret another man's results may get impressions that are entirely sincere, but that are not based upon a full knowledge of the facts and of the details. Dr. Howe has stated it would require, for example, from a cupful to five or six quarts to inoculate a man in order to produce the reactions we have been claiming because this organism we are dealing with has such low virulence. It is the very fact of the low virulence of that organism that makes it so dangerous. If it were a virulent organism it would be a fight to the finish, and there would be a knockout blow very quickly.

Another essential thing to keep in mind is that a dose is a relative thing. We are likely to think of the lethal dose as being practically a constant thing for all the adults in this room. There are probably people here who would be more injured by 1/1000 part of the dose that some other man here would take without injury, than the average person would be injured by one-half of that dose. It is always a relative matter as to how much is too much for a particular individual.

I want Dr. Howe to interpret this: I will show you two rabbits from the same litter, approximately 2400 grams in weight. One of them was kept as a control, and the other was inoculated with a dose represented not by a teacupful or five or six quarts for a man, or relatively less in consideration of the fact that it is a rabbit, but I simply took the infection and poison that was in one bicuspid tooth. I crushed the tooth and washed it quickly in normal salt solution and injected that, but not into the circulation. My judgment is that the total amount of bacteria injected into this rabbit would not be more than could be put on the head of a pin, or not more than the size of the head of a pin. The one reduced in weight following the injection of that dose, from 2392 grams to 1560 grams, a loss of over 800 grams or thirty-four per cent., and they both had the same diet. The only difference in these two rabbits is the amount of infection that was in one bicuspid tooth at one moment of time. Is it not probable that if we were to take twenty teeth and take the infection from them, and inoculate a rabbit twenty times that big with it, or inoculate a man, we might expect practically the same result? And yet those rabbits were not more than normally sensitive to this type of infection.

Again, the infection that was growing in that tooth at that moment would duplicate itself every few hours or every day, and if we had only one infected tooth duplicating its toxin and sending it out into the animal every day for twenty days, and instead of one dose get twenty doses, might we not expect to have one source of supply inoculate a much larger animal than we have here?

In showing slides I would simply show individual cases, and it would be difficult to bring to you a final conclusion, because when we show an individual case Dr. Howe may say that is a case in a thousand. My reply might be that there is a certain ratio of percentage that is normal for certain recurrences. If we go through all the literature of inoculations of rabbits that have been tabulated, we find that approximately two per cent. of the rabbits inoculated with streptococcus from different sources produce involvement of the eye, so the chances would be one in fifty, in inoculating the rabbit, that the eye would be involved. And yet I can show you some cases of eye involvement where that organism seemed to pick out the eye. I can show you a series of cases that will give overwhelming evidence like that. What seems to be of more importance is to interpret if possible, and relate these various infections to one another.

The probabilities are that Dr. Howe may be more nearly right than we think he is, and yet his interpretation may be quite different from what he will make a few years from now.

(Slide). A boy who had an involvement that kept him in bed almost constantly from twelve to fifteen years of age, with acute exacerbations in hands and knees. There is very slight destruction of tissue around the apices of the teeth. He had a blood count of 12,000 to 16,000 while running this fever. His mother said to me, "I would be the happiest woman in Cleveland if I could see my boy die. There seems to be no hope for him." After the removal of these teeth—and there was very little destruction of tissue about the apices—his blood count fell in twenty-four hours after the removal of these dental infections, from 12,000 to 8,000. He so rapidly improved that he is now up.

(Slide). Here he is up, and fat and plump. Could you persuade him that was a coincidence that that mouth infection when it was cleared up changed this whole trend?

Dr. Howe: What were his life and environment before he became in that condition? What was his diet?

Dr. Price: He had been living in one of the Middle Southern States. I do not know what his diet was. They were people in very moderate circumstances. He was here under a changed diet for many months, but there was no change in his temperature or the acute exacerbations, but immediately after the infection was removed the whole clinical picture changed.

(Slide). This boy died a short time after the picture was taken. A culture taken from this boy's tooth inoculated into a group of rabbits produced ninety-three per cent. of heart involvements, whereas that same strain grown on an artificial medium for seventeen days and inoculated into another group of rabbits only produced heart involvement in twenty per cent. of the rabbits. That quality which the culture possessed had been lost in the meantime. If we take all the cases, you find about ten per cent. of animals develop heart lesions when inoculated with streptococci. Yet here we have a strain that produced in thirty rabbits heart involvements in ninety-three per cent.

(Slide). I would put great emphasis on the weak link in the chain. Here is a woman who had these various teeth in her head, and this lateral had been injured by a fall when she was twelve years of age, and she is now forty-seven. She had been in insane asylums more than half the time for the last five years, and had not been out of them for more than four months at any time in five years. The weak link was the central nervous system. After the removal of these dental infections, this woman who had not slept for five weeks, took to sleeping much more normally. She went through the nervous irritation series quite rapidly. In about two weeks I was notified from the State Hospital that she was ready to go home. They kept here there under observation. That woman is now in that institution as one of the attendants of the office, in an institution with two thousand patients. She is responsible for the office for ten hours out of the twenty-four, and she says the superintendent tells her she isn't any more insane than he is. She hasn't had a break in her nervous system for a year and four months. She hadn't been without them any more than a few weeks at a time for five years before that.

(Slide). A man with an atrophy of the arm that followed an acute attack of rheumatism at a time he was having dental work done at the age of twenty, and at which time he exposed himself by getting into ice cold water. After clearing up the dental infections that arm has increased so that now he can put up fifty pounds with it and swing a heavy hammer all day. There has been no change in diet. The change has been to remove his dental infection.

(Slide). A woman with acute tartaris. She had been sitting up eight days; she couldn't lie down because of the pain. We took the infection from the tooth, and inoculated it into a series of animals.

(Slide). Of the animals inoculated many showed myocytic abscesses, far more than would be produced by the average streptococcal culture. After the removal of the roots of the tooth she had no recurrence of the condition for two years, when it developed on the right side of her neck. We extracted a tooth, and in twenty-four hours the symptoms had disappeared. That was done in May of 1919, and she has not had an attack since.

(Slide). Out of fifty rabbits inoculated with cultures taken from about fifty individuals, only the cultures taken from two individuals have produced infections in the ovaries and tubes of the rabbits, and both of those patients had been operated on for ovarian infection, and one had been operated on twice. Why should the cultures taken from the two women who had definite involvement of the ovaries and tubes be the only ones to produce that condition?

(Slide). A young woman with a marked involvement of the left eye, iritis very bad. The occulist who sent her to us said he was fearful she might lose the sight of her eye.

(Slide). Her teeth. Slight areas around the molars and an ostitis about the central incisor. I removed the teeth and incidentally that condition of the eye which had been continually getting worse for several weeks, in twenty-four hours had greatly improved, in three days an improvement was apparent to her, in ten days a marked improvement and in three weeks the vision was quite well restored.

(Slide). The culture taken from the central tooth and inoculated into a rabbit in twenty-four hours gave a marked iritis.

(Slide). Condition of rabbit's eye in seventy-two hours. Less than two per cent. of rabbits inoculated generally have shown eye involvement, and yet we have in this case this definite involvement. Why should that be?

(Slide). Another rabbit inoculated with that culture developed ulcers in the peritoneum.

(Slide). Another developed marked lesions in the skin.

(Slide). As to the interpretation. Here is a girl with heart involvement, twenty-two years of age, out of work and she has been for some time. She needs to work. Her father is sick. Here we have these crooked teeth. What is our duty to that girl? Here is a lateral tooth with putrescent pulp and no resorption of alveolar bone around the apex. We have a person with an entirely abnormal type of reaction, not only an abnormal sensitization to the infection, but an abnormal fighting power against the infection. We cannot judge these X-ray pictures by the same standards. The mass of people are not yet affected by dental infection, but what about the ones we do not see who are affected? When we study this girl we find a key to the whole thing. She has been fighting streptococcal infections all her lifetime. There are seven cases of heart trouble and nine of rheumatism in her family. Here is her chart. Your duty here is to take out every tooth you cannot be sure has a good vital pulp. When you have a low defense and a source of infection you have two factors. Make an intensive study of every patient, find the patient's susceptibility, find the defense and then you have the answer to Dr. Howe's interpretation. It is partly nutrition, partly defense.

QUESTION: Defense against what?

DR. PRICE: Against a lot of things, one of which is infection.

(Slide). Chart of a man. That man will not be easily affected by dental infection, and that is the kind of case you will get away with a lot of times. This man, however, was wearing glasses, and after we removed this infection he did not need his glasses.

I believe the most important single fact that has come to our dental science since I went into dentistry is this: The man who shows these columns clear always has a large area of resorption about a tooth with a given infection, whereas the other type of person, with susceptibility to streptococcal infections has small areas of rarefaction, and you must have different standards for interpreting the X-rays of the two people. The man with a large area of resorption has a good defense, and as yet probably is safe. The man that brings the small quantity of infection, let us say a putrescent pulp, with a small area of resorption, has a low defense, and that is the great danger. Why? Because he is not killing the germs at the source. The pus that comes out through these fistulæ is generally sterile, because it is the product of a good warfare. The infection at the root end that hasn't enough reaction to produce an abscess with a fistula is not sterile, and the infection is going from that through the system. I believe that is one of the most important new truths we have had in our dental work.

Dr. Hartzell: I want to mention but a few things in reply to Dr. Howe. We find pyorrhea in the mouths of many people who are not limited as to diet. They do not live on a scorbutic diet. We find pyorrhea in the mouths of people who have as evenly-balanced a diet as it is possible to get, people who are getting whole grain and plenty of fruit.

These pictures of Dr. Howe are not of pyorrhea; they may be rachitic and they may be caused by scorbutic diet, and are evidently infections that explain these conditions.

Dr. Howe did not say whether he examined the bacterial growths made possible in these animals where their resistance was cut down. I would like to know what the bacterial invasion in those cases was. When you create conditions that make bacterial invasion easy, they usually are there in tremendous quantity.

I have seen a man pricked with a needle at a postmortem, die of septicemia. He had low resistance to that germ and it multiplied, and he went down. I have seen the blood count in influenza drop 2500 in twelve hours, and I have administered vaccines and seen the leucocyte count drop 2000 in twenty-four hours. Infection is not to be trifled with.

I have not been able to produce pyorrhea by introducing the streptococcus into the gums. I know by actual observation that the first response to the injection of the streptococcus viridans into tissue is not to produce pus. It is not a pus producer. The staphylococcus is the pus producer. But the streptococcus viridans plows and harrows the ground for the staphylococcus. The things produced by the streptococcus inimical to the body are its excrement which is an acid, and the digestive ferment. The digestive ferment is not strong enough to turn human tissue into liquid, as the staphylococcus does, but it eventually produces in the center of the granuloma a little straw-colored fluid. At the gum margin it produces an inflamed area, and the gum margin begins to bleed. It does not produce the pyorrhea, but it prepares the ground for the staphylococcus, which comes in, and you have pus. The streptococcus reduces the immunity and produces the mild inflammatory condition, and when seen in the heart, the kidney, the gum margin, the spleen, it shows the plasma cells and lymphocytes, and when you mix any number of staphylococci you get the phagocytes. Where we do intelligent tooth brush work we get rid of our gingivitis and of our pus flow. When we see these bad cases come in and see them clear up under treatment, we do not give the credit to diet; we give the credit to the tooth brush.

I believe if the children can be taught the type of tooth cleansing we are now teaching constantly, the heart disease, the pericarditis, the endocarditis, the myocarditis and the rheumatisms reported in the last volume of the census report would be cut in half.

We have some heart valves in the centers of which are abscesses, and there was no evidence of a lesion on the surface of those valves. The bacteria which made the abscesses in those valves had been carried into the valvular structure, and instead of having been pounded into the valve by injury it had been carried in by the circulation. We have a kidney section that is full of blue spots. They are simply masses of bacteria in inflammatory areas. These bacteria were taken from the mouth of a man with crooked hands, and were grown in artificial culture, and we inoculated animal after animal and could not produce lesions in any of the animals with it. We could not understand it. Professor Larsen finally said, "Let us plant some directly from that man's dental lesions into the interior of the chamber of a live rabbit's eye, and let it grow twenty-four hours in the vitreous humor, and then inoculate the animals with it." We did that, and we had production not only of arthritic joints but of kidney lesions that were very bad and the animal died. What happened to those bacteria during the time they were in that chamber to bring about this change? There were no antibodies there, no leucocytes, no red cells, and they came up in virility as a result. And so the bacteria in the body are changing their character from day to day. I believe we should cut down the bacterial growth in the mouths of our patients, observe, of course, reasonable dietetic arrangements, and correct the malocclusions. To recapitulate, the thought I would leave in your mind is briefly this: These remarkable cases of osteomyelitis shown by Doctor Howe bear all the ear marks of intense and virulent infections. They are no more comparable to the pyorrhea found in the human mouth than are the intense inflammatory changes which we see in infectious osteomyelitis. Just what explains the presence of such infectious inflammations I cannot say. It scarcely seems possible that diet alone could explain them. Even starvation would not produce, and does not produce that type of osteomyelitis, and experience actually has taught us that we can prevent pyorrhea and cure many such a case by the daily removal of injurious dental mold from the teeth by the vigorous and efficient use of the tooth brush.

Let us not be misled by this work of Doctor Howe in relaxing our vigilance in prophylaxis nor expect to correct our pyorrhea cases by diet. Of course, proper diets are better than improper diets, for the body always is influenced directly by the sort of food you give it.

Dr. Ambler: I have been very much interested in the discussions this evening, and especially in that part of Dr. Howe's talk having to do with the introduction of silver at root ends, and I have thought the following might be of interest to Dr. Howe and of some general interest:

In 1896 I commenced experimenting in drying root canals and treating with silver nitrate, a solution of from twenty-five to fifty per cent., made with distilled water. I treated some canals in the mouth and some out of the mouth. Dr. Bethel also took the matter up and pushed it along in good style, and wrote a paper about it which can be found in the *Cosmos* of September, 1896, twenty-four years ago. The article is illustrated by a number of cuts of teeth, some roots and some with crowns that had been treated In 1896 I bought the first cataphoric outfit that came to Cleveland, and it was with that we experimented. We cleaned out the canal as well as we could with instruments. We then used pyrozone, and after that, warm water to clean the canal. We dried it out thoroughly, and then took a wooden toothpick with threads of cotton on it, saturated with silver nitrate and worked that up into the canal as far as we could. Then we took a small pellet of cotton and dipped it into a solution of twenty-five or fifty per cent., as the case might be according to conditions, and placed the negative pole on the cheek or temple, and on a small platinum wire attached to the positive pole we wound a few threads of cotton and passed it through this pellet of cotton in the pulp canal, and treated the pulp canal for five minutes at from ten to twenty volts. We did not claim it filled the canal; it was for lining the pulp canal, and it was found by actual experiment after the canals had been treated that way, that the solution penetrated into the tubuli from one-fifth to one-sixth the length of the tubuli.

Dr. Bethel wrote another paper, a supplement to the first, and that appeared in the *International Dental Journal*, in August, 1877. He demonstrated after the canals had been treated that way, that absolutely no bacteria could be found. We also in some cases used weak ammonia water as a reducing agent. We found the method was a success, and I have been using it ever since.

Dr. Howe, (Closing): I should not like to be misunderstood. I should not like to have you think that I attribute all disease to diet; but in such a disease as pyorrhea, either the micro-organisms cause it or they do not cause it. If they do cause it—inoculate the animal and produce the pyorrhea. Inoculation does not cause it as is generally admitted.

There are many organisms in pyorrhea besides streptococcus viridans. When these men started out two or three years ago to explain this theory of focal infection as pertaining to teeth, they took the streptococcus viridans as the causative agent. You cannot hold them to this any longer. Staphylococcus has been mentioned. That is, of course, the usual organism of pus.

Dr. Price takes a pulp with a conglomeration of everything in it and squirts it into this poor rabbit. He holds it up here and shows us that it looks thin and sick.

With what care he made his injection, or what other treatment the animal has had, I do not know, but certainly streptococcus viridans alone would not have caused this, nor any appreciable illness. It is always a rabbit. A cat is not susceptible to streptococcus infection. Dittmar, after using 75 cc. in a 1000-gram rabbit, said it is better to use 100 cc., or seven liters. In the case of a man of 70 kilos, a large dose of viridans is necessary to cause a lesion.

Dr. Price: That tooth root was filled to the end.

Dr. Howe: There was something besides streptococcus viridans in your injection, because no amount of streptococcus viridans would do that. Your cultures were impure. You may have given him anything and everything; I do not know.

Dr. Hartzell's method of trying to stop pyorrhea is like trying to stop a snow storm by shovelling snow off the sidewalk. I think you will find that nutrition is at the bottom of pyorrhea. I have been able to produce no condition that simulates pyorrhea and caries except by the nutritional derangements described.

These conditions are pronounced, of course. Nutrition disturbances that leave effects upon the teeth may be produced by alcoholism, pancreatic affection. The glands, of internal secretion may not work properly, nervous affections may enter into it. But as these micro-organisms act in dental disturbances so they act elsewhere. All disease does not arise from the teeth. People who have no trouble with their teeth have these troubles as well as people who do have tooth difficulties. Teeth were placed in the head for a purpose and they can be retained.

As far as these cases of Dr. Price are concerned, every one of us would agree as to removal of the teeth. I don't know how many men in this room have abscesses that would show under the radiograph, but probably quite a good many, yet they seem in reasonable health. Whole families of such cases as Dr. Price has shown have gonorrheal arthritis. Cleaning out the mouth lesion helps, but it's not a cure-all. There are many other ways of explaining relief following extractions. The disturbance may be due to pressure that follows pulp degeneracy, or from calcification or thickening of tissue at a root end, a malformed tooth causing pressure such as an impacted wisdom tooth. The trouble that often followed is a mechanical disturbance, but it is not infection.

Talk to a man making a study of the blood from a chemical standpoint, and hear his ideas upon rheumatism. He looks at rheumatism from a chemical point of view. Go to another man studying infection, and he talks infection. You go to the pathological department and get still another view. We know little about growth and resistance and all that is in the human machine.

I believe we have been pulling out too many teeth. The doctors cut out too many appendices a while ago. They are not doing as much of that as they did. We had a patient with arthritic heart trouble in the Forsyth Hospital. His tonsils were swollen. They sent the boy to see if his teeth were all right. They were all right. An operation on the tonsils was advised. I asked the mother how many children she had. "Three, or I did have." "Were they all arthritic?" "Yes." It was gonorrheal arthritis, a taint in the family. I said "Are they going to operate?" "Yes," she replied; "I hope they do better than they did the last time." The doctor took the tonsil out of the youngster, and in three months he died. The tonsil is a lymphatic gland and the object of it is to neutralize the poison in the system, and whatever ailed that boy or what the nature of the toxin no one knew, but that tonsil was doing its best to neutralize that toxin. It swelled up because it had more than it could carry. And when the doctor took out the tonsil, the other lymphatic glands were not equal to the work, and the child died. The other boy they did not touch, and he is driving a team.

When you see these cases, look for general causes behind them. We have an institution in Boston known as the Christian Science Church, and a lot of people after going there throw away their crutches and run like everything. The mental factor needs to be taken into account in some of our reported cures.

I have a great deal of sympathy for the streptococcus viridans. It has been held accountable for altogether too many troubles. The gonococcus is associated with one disease, the pneumococcus with one, but the streptococcus is claimed to be associated not with one but with five hundred diseases. Why does the streptococcus locate once in the kidney, once in the heart, once in the big toe, once in the back of your head? Localized tissue resistance would explain all this. Dr. Hartzell when he is cleaning teeth is keeping up resistance and keeping up the circulation, and preventing stasis. A free flow of blood is one of the best antiseptics in the world.

Everything doesn't depend on diet, but I think diet lies behind decay, and nutrition behind pyorrhea. It is not the youngsters that have pyorrhea. If a youngster has it he is rachitic or has a thyroid or some nutritional derangement.

THE GOLD INLAY*

BY GEO. H. MEANS, D.D.S., LOUISVILLE, KY.

CLINICAL INSTRUCTOR UNIVERSITY OF LOUISVILLE, COLLEGE OF DENTISTRY; BEING A REVIEW OF THE INVESTIGATIONS OF THE LOUISVILLE UNIT, WM. E. GOEPPER, D. D. S., CHAIRMAN.

THE SCIENCE OF CASTING METAL is possibly the most universally liked of any part of our professional work. The mystery of the art, the uncertainty of results, the discouragement of failure, the elation of success, make it an extremely fascinating "game," to the dentist who has determined to excel.

This is fortunate because the unlimited possibilities of cast metal restorations bids fair to make this type of work an all important element in the ideal dentistry of the future.

The gold inlay may be regarded as the initial and most important step in the art of casting. Most important because it is the initial step. It is doubtful if an operator can have the height of success in the casting of the larger restorations unless he has mastered the intricacies of casting a perfect inlay.

The rules that govern the various steps of inlay work will generally apply to any other form of casting.

CAVITY PREPARATION

Cavity preparation for inlays calls for but little deviation from the rules which stand like a monument to the celebrated Dr. G. V. Black. The obliteration of undercuts, the flare of the walls, the bevelling of margins are all generally understood by the dentists and should be carried out with utmost caution. This is difficult to do, in all cases, especially by indirect vision, and a wax impression of the cavity studied through a magnifying glass will reveal many imperfections to the over-confident operator.

All margins should be beveled of course if it can be perfectly done, and it is left to the discretion of the operator to decide in each case as to whether he can perfectly bevel the gingival margin or had better leave it straight. Inasmuch as the gingival wall should in all cases be carried beneath the free margin of the gum and usually has already gone further than that by decay, it is difficult, to say the least, to perfectly bevel the gingival margin in cavities on posterior teeth.

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*Read before the Jefferson County, Ky., Dental Society, Nov. 1920.

INLAY WAXES

Pattern-making is by all odds the most important step in inlay work, for what can perfection in cavity preparation, investing, burning out or casting avail if the pattern is a failure?

The manufacturers have given us waxes that are free of all objectionable qualities and which possess the ideal properties of cohesion, toughness, brittleness and freedom from adhesion. They are of low fusion, will break before bending when cold, will not flake when carving, nor leave an undesirable residue in the mold.

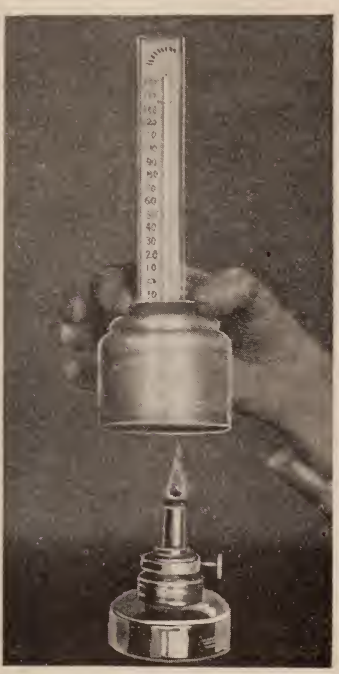


Fig. 1

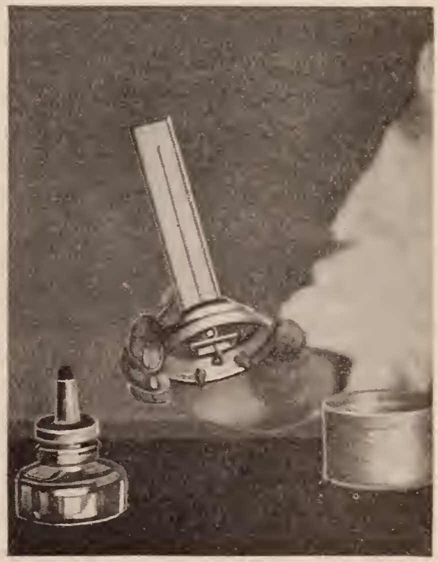


Fig. 2

Fig. 1—Softening inlay wax.
Fig. 2—Showing interior of wax heater. Note inlay wax in position on pins.

But the trouble is that these ideal qualities usually are destroyed by manipulation and faulty technic in pattern making, and in the end an imperfect inlay is obtained and the chagrined operator seeks consolation in that old alibi, "shrinkage of gold".

Inlay waxes are composed of beeswax, paraffin, resin and coloring matter, no one of which is fit for our purpose, but combined in the correct proportions they will, in the molten state, take on the molecular arrangement that gives them the ideal qualities enumerated for the making of inlays.

But this molecular arrangement is completely broken up by softening the wax in the open flame and by squeezing and working it in the fingers. The application of too much heat causes the paraffin to volatilize which lessens the toughness and brittleness of the wax and admits of the property of adhesion, a most important thing to be avoided and which was the object of the paraffin to counteract.

Moist heat for softening of the wax is contraindicated because it lessens the cohesion, which allows the wax to flake while carving, and also makes it difficult to add to if this should become necessary.

The ideal method is to soften the wax by a low temperature of dry heat unexposed to the open flame.

A metal box should be prepared with a hole in the top and a cork fitted, through which a thermometer has been adjusted. On the bottom of the cork are pins upon which the wax is to be suspended inside the box.

The supposition may be that upon the application of heat the wax will slip from the pins but such is not the case..

For average waxes the metal box is heated over a gas burner until the thermometer registers 130 degrees F., then allowed to cool to 125 degrees F.

Thorough investigation of a practical nature has convinced this unit of the superiority of Maves' and Kerr's inlay waxes and the above temperatures will be found correct in their use, though a difference in room temperature according to season may necessitate a slight variation.

Previous to warming or softening the wax it should be cut into the desired shape of a wedge, a cone, or U-shaped for M. O. D. cavities. Don't soften the wax and squeeze it into shape in the fingers, for this puts every molecule of the wax into a state of compression or elongation, and it will not take as true an impression in that condition.

Wax softened and handled according to the above directions is thrust into the cavity in a state of minimum expansion and molecular strain, and when chilled undergoes practically no contraction and withdraws from the cavity with perfect ease. Whereas wax exposed to the open flame shows such marked expansion and subsequent contraction when chilled, that it is possible that this may account for some of the discrepancy attributed to the shrinkage of gold.

A matrix should be used on step cavities in bicuspids and molars because confining the wax to the cavity under pressure will make it take a more sharply-defined impression of the gingival wall, and will prevent the inconvenience of having it squeeze out under the bell-shaped contour of the adjoining tooth.

The matrix should be of a type that is easily and quickly removed. The soldered band matrices are contraindicated because it is difficult to remove them without disturbing the pattern, and if the pattern ever shows the slightest tendency to rock it should be discarded immediately. A perfect inlay from a rocking pattern is an impossibility.

When the softened wax is thrust into the cavity it should be held down firmly until chilled, because the compression of the molecules will allow it to change form while warm.

The matrix should be removed immediately and the pattern lifted from the cavity and examined with a magnifying glass. If all margins are well defined the cavity should be dried, the pattern replaced, the excess wax cut away and the margins burnished with warm blunt instruments. Better adaptation can be obtained to dry margins and if the wax is merely warmed and burnished and not melted, no trouble will be experienced in getting the pattern from the cavity.

The practice of having the patient triturate the wax with the opposing teeth is not advisable because of the danger of rocking the pattern. The operator should be able to carve the wax so nearly into perfect form that very little if any grinding is necessary to obtain correct occlusion. If for any reason he desires knowledge of the opposing imprint it should be done on a trial impression and this saved as a model by which to carve the real pattern.

It will make for a more beautiful piece of work if the pits and grooves are sharply defined and this can best be done with edged tools.

The pattern should be removed from the cavity and examined to determine the exact point for the insertion of the sprue which will allow the freest ingress for the gold in all directions, which usually will be found at the approximal contact point. A sprue of 16-gauge wire is best adapted for inlays, and the distance from the crucible to the mold should be a quarter of an inch.

At this stage the wax is in a state of great compression and there is danger of molecular motion or a release of those compressed molecules which occurs at varying times and temperatures, and to avoid all possibility of this warpage or expansion, the pattern should be invested immediately. First it should be thoroughly cleansed with a spray of alcohol and then blown absolutely dry.

INVESTING

An investment material should be used which has considerable hardness after being burnt out. Many of those on the market are little more than dust after the burning out process, and it is plausible to believe that much of the so-called contraction of gold is really a result of distortion of the mold caused by the force of casting.

This is especially likely in the centrifugal type of machine where the force is directly outward. It is claimed by the vacuum and direct air pressure adherents, that their machines have less of a throwing force and more of a lateral force and that the strain on any one wall of the mold is not so severe.

A very fine grade of silex mixed with equal parts by weight of Kerr's Snow White Plaster makes an investment material which remains satisfactory in hardness and freedom from porosity after the burning out process, and it will resist the force of casting without distortion. This silex, No. 27 grade, can be obtained from Whitaker, Clark and Daniels, 250 Front street, New York City.

It is advisable for the operator to acquaint himself with the finest working qualities of his investment material. This only can be done by a series of painstaking experiments, and he should start by deciding upon and adhering to a definite proportion of investment and water which will give the desired consistency to accord with the proper working time.

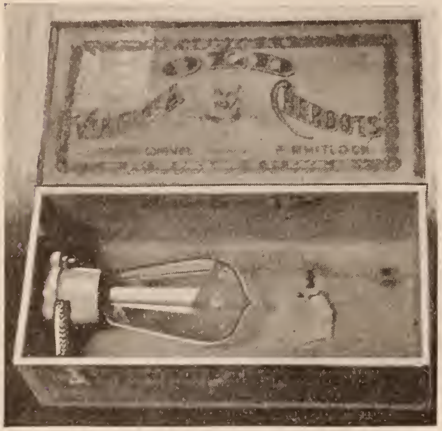


Fig. 3

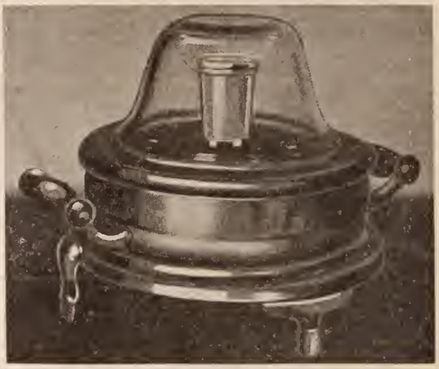


Fig. 4

Fig. 3—Showing cigar box with electric light for drying out investment.

Fig. 4—The investment cup on electric hot plate, covered with Pyrex Bowl. The cup should rest on two fragments of plaster, the investment not coming in contact with the heating element.

Of the investment mentioned, two and one-half dwt. will form the proper consistency when given to thirty min. of water. The water should be poured on the center of a glass slab and the powder sifted into it, each particle being satisfied with water immediately, a minimum of spatulation being necessary.

A definite mix of this kind will be free of air bubbles which is obviously better than trusting to get rid of the bubbles of a haphazard mix by jarring and rotating the bowl.

The double form of investment results in superior casts as regards smoothness and freedom from nodules.

With a very small camel's hair brush the dry pattern should be painted with the investment, working from the sprue outward, blowing constantly until the wax is completely covered and free from air bubbles.

Then more investment should be added until the pattern is covered to a depth of a quarter of an inch on all sides.

This should be set aside until the glaze has disappeared when a second investment should be added to fill up the cup. For this filler Brophy's Imperial Crown and Bridge Investment is thoroughly satisfactory.

BURNING OUT PROCESS

The investment never should be exposed to the open flame and in burning the wax out greatest care should be taken that there is not the least disturbance within the mold. Many rough casts are caused by applying the heat too freely and causing a bubbling of the wax which roughens the walls of the mold.

The caption, "Burning out Process," is misleading. The correct idea is not to burn the wax out, for not an atom of the wax should be lost by melting out through the sprue hole, and for this reason the investment cup should be stood upright and not laid on its side.

The "Burning in Process" is nearer the truth, for it is desired that all of the wax that is not lost through volatilization shall pass into the pores left in the investment by the drying out of the water.

After the investment has set for half an hour it should be placed, sprue still *in situ*, in a cigar box or other container with an electric light globe and left for about half an hour. Sufficient heat is thus obtained to dry the investment of all moisture and to cause the wax to disappear from the mold into the pores of the investment.

Were the mold opened at this point it would be found empty, excepting in the case of a few waxes having a greater content of resin which leaves a residue on the floor of the mold, but whether this be true or not the investment can now be placed on a hot plate or in an electric stove or gas oven and heat applied without the least disturbance of the mold.

No definite time can be set for any type of heating apparatus that is or ever will be on the market, as to when the burning out is complete unless the same size investment cup is used in each case, the same wax used, the same investment and not too great a difference in the size of the pattern.

It remains for the individual dentist to determine by a series of experiments just how long it will take to burn the wax out of his particular type of investment.

It can merely be said that just enough heat should be applied to cause the investment to smoke and the heat should be held at this point until the smoking stops. Then the investment will be of a light chocolate color with just a sufficient residue of wax to act as a flux, and if allowed to cool first, a casting will come from the mold so bright that it hardly needs any cleaning with acid.

CASTING

Metallurgists say that anything that tends to delay the congealing of molten metal, thus allowing for a continuation of molecular motion, increases the contraction of the mass.

A large casting contracts more than a small one because it is slower to cool; hot molds delay the congealing of the gold and thus contraction increases; big investments retain heat and this increases contraction.

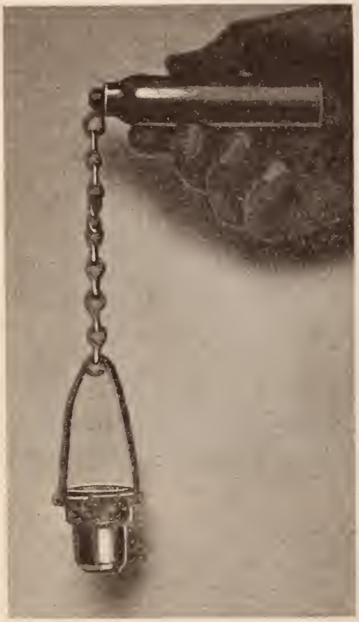


Fig. 5—The hand centrifugal, a simple, inexpensive and efficient inlay caster.

Therefore to control contraction the investment should be no larger than is necessary to cover the pattern to a depth sufficient for strength to resist the force of casting; *secondly*, the mold should be cold in order to hasten the congealing of the gold, and *thirdly*, a superheat should be used for the purpose of melting the gold quickly.

The most satisfactory flame is made with city gas and oxygen; but in the use of this intense flame, care must be taken not to superheat the gold for this is one of the main reasons for contraction by allowing molecular motion of the gold to continue longer.

Where city gas is not available, acetylene is the flame next in preference.

"Contraction of gold:" there is the bane of the inlayist's existence, but is it contraction of gold or faulty technic? Is it contraction of gold or give of the walls of a dust-like mold to force of casting? Is it contraction of gold or rebound of gold?

The last is a very strong probability.

Experimentation has proven that a casting thrown with full force, instantaneously, will show much greater discrepancy at the gingival than one cast with a hesitant force for the fraction of a second, then given full momentum.

Therefore it is plausible to believe that much of the so-called contraction of gold is rebound of the molten metal when it strikes the wall of the mold, and that it is congealed before it has a chance to settle back to place.

The oft repeated question, "Why does the contraction always occur at the gingival?" may have its answer here: "Because there is usually a dovetail on the occlusal which has a tendency to hold the gold in place and prevent rebound, whereas the gingival has no dovetail, and it is here that rebound is free to take place."

Our experiments on this point have made us doubt the theory that contraction occurs where the gold is last to congeal, *i.e.*, near the sprue. We believe that it is rebound of the molten metal. If we are wrong how can it be explained that our inlays show no contraction where they have been cast with a force that gives the gold a chance to get in place yet not great enough to cause rebound? These inlays have had to congeal next the sprue! And when we can show inlay after inlay in which the shrinkage is nil we are bound to have some faith in our contention.

The centrifugal type of machine which winds on a spring, usually starts with a slightly hesitant force, then quickly gains full momentum. But those which turn by a crank must be governed by the operator, and it takes no little skill and concentration to judge between enough force to get the gold home, yet not enough to cause a rebound of the metal.

Greatest stress should be given the importance of thoroughly cleaning the gold before each casting. The flame should be thrown upon it as if you were literally trying to burn the gold up, teasing it all the while with the point of a slate pencil frequently dipped into Ney's Oxidizing Flux.

When the gold appears as an absolutely clean, pure, globule of dancing metal it should be dipped into acid and then thoroughly washed.

Gold treated in this way will melt easily and quickly and has a much greater flow which enables it to reproduce the finest of margins where an unclean, sluggish gold would fail.

After the casting is taken from the mold and cleaned with acid, some precaution should be taken to neutralize that acid because mere washing does not always suffice. The failure of many well-made inlays can be attributed to disintegration of cement from a residue of acid.

For the purpose of neutralization any alkali will do. Two simple alkalis that are found in every dental office are ammonia and bicarbonate of soda. Let the casting remain in one of these for about five minutes and no disintegration of cement will take place.

A summary will comprise the following points:

First, leave the gingival margin straight unless it can be perfectly beveled.

Second, soften the wax by dry heat unexposed to the open flame.

Third, double invest for smooth casting.

Fourth, in burning out never expose investment to the open flame, but apply the heat in such a manner that the wax fills in the pores of the investment left by drying out the moisture.

Fifth, in casting use a machine that does not apply the full force instantaneously.

Sixth, neutralize the cleaning acid before setting inlay.

The making of perfect inlays demands the mastering of a definite technic. Mastering a technic means habituating one's self to doing a certain thing in a certain way until it becomes second nature.

In mastering this technic the operator should experiment by making inlays for cavities in extracted teeth, and doubtless these experiments will result in considerable discouragement before perfect inlays are obtained but so great is the fascination of the "game" that the work is a pleasure.

1347 Bardstown Road, Cherokee Apts.

ORAL PROPHYLAXIS*

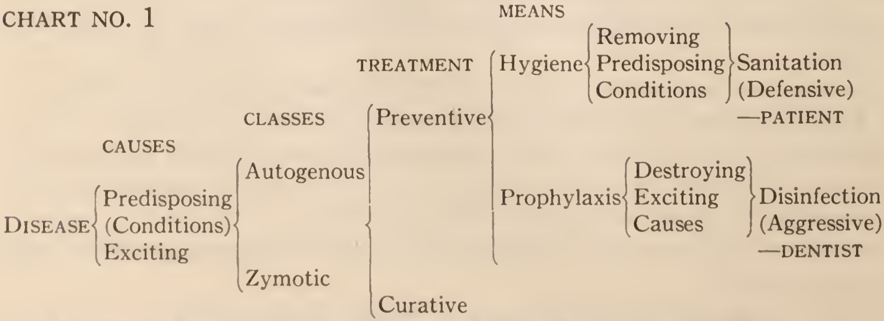
BY JUSTIN D. TOWNER, D.D.S., MEMPHIS, TENN.

IN INTRODUCING THIS SUBJECT it is well to understand what prophylaxis really means in dentistry, and just how it differs from mouth hygiene, with which it is so intimately associated. We should arrive at a definite conclusion regarding the true significance of each, and thus draw the proper line of distinction as it applies to our professional endeavors.

Hygiene means the "science and art of preserving health," and prophylaxis that of "preventing disease." We know, then, that of the two methods of treating disease, preventive and curative, both hygiene and prophylaxis refer to prevention, but just what is meant by one which is not contemplated in the other, some never have stopped to determine. At first thought the two seem synonymous in that the preservation of health signifies the prevention of disease, but the means by which each is accomplished are at sufficient variance to entitle them to separate consideration.

In the realm of preventive dentistry, we have two distinct disease-producing influences to combat; one, the predisposing condition, the other, that of exciting cause. Of these, hygiene relates to the removal of the former, which is accomplished by sanitation, and is therefore a defensive measure, while prophylaxis refers to the latter, and is accomplished by disinfection, which is an aggressive procedure. We may know from this that, so far as dentistry is concerned, hygiene, being defensive, is chiefly the obligation of the patient, while prophylaxis, being aggressive, becomes the duty of the dentist. The exhibited chart No. 1, will serve to impress the correctness of this conclusion and show the simple process of its deduction.

CHART NO. 1



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*A Clinical Lecture before the Tennessee State Dental Society, 1920.

The responsibility of a healthy mouth must be at least equally divided though, in fact, the dentist's obligation is only one-third inasmuch as it is reasonable to conclude that by aggressive procedures we can only accomplish the destruction of exciting causes of disease, and that the patient's defensive efforts in proper care of the mouth and right living are responsible for the maintenance of health. The reverse also is true in that the more successful the patient is in removing predisposing conditions the less aggressive will our efforts have to be.

It is evident that sole reliance can no longer be placed in either hygiene or prophylaxis as an independent health measure, but that the two go hand in hand. The sooner the oral prophylactician admits the mistake of assuming a greater obligation than possible to discharge, the more apt he will be to demand the thorough cooperation of the patient in all matters pertaining to mouth hygiene. There are two principals, then, the dentist and the patient, each having a definite responsibility to assume and obligation to discharge. If either of these fails in the performance of this duty, one to the other, and to himself as well, the penalty is written in terms of disease.

The first step in prophylaxis, as in all dentistry, is that of a thorough examination. This to be conclusive should be both oral and systemic.

The oral, or mouth, examination should include the buccal and faucial tissues, investing tissues, tongue, occlusion, contact points, caries, erosion, devital teeth and margins of fillings and crowns. A routine can be easily established which will greatly simplify the procedure, and by the use of usual diagnostic aids, including the X-ray, definite information may be gained quickly.

The systemic, or physical, examination must take into account the complete blood picture, urinalysis, heart, lungs, digestion and elimination. This is necessary in order to determine the tolerance and recuperative powers of the patient, and is often the means of discovering some insidious disease which not only is detrimental to mouth health but if not discovered in time will materially shorten life. We must keep constantly in mind that dentistry is first of all a health problem, and that any means of attaining this end is not only justifiable but obligatory. It is not, however, the duty of the dentist to go beyond his field of diagnosis and operation, yet he should call to his assistance those of other professions who are capable of aiding in this great battle against disease.

The second procedure, though dependent somewhat upon the tissue showing most susceptibility to disease, is usually that which has to do with the exposed hard structure and may be justly termed operative. This contemplates the correction of traumatic occlusion, correction of faulty contact points, removal of visible deposits, all fillings and smoothing and polishing exposed surfaces. Whenever it is necessary to restore normal tooth form for purely prophylactic reasons by means of filling, the time most suitable for this depends upon the condition of investment tissues, because in case these need attention they should have first consideration. As a general rule, though, all operative procedures may be considered second in order.

Third in importance is surgery which in the great majority of mouths is necessary at some points, usually just underneath the gingival septum if not entirely around the tooth. What is meant by surgery here is the removal of subgingival deposits and excessive free gingivæ which give evidence of becoming the excitant source of disease. This has to do with the treatment of soft tissues, as well as hard, and is just as truly prophylactic surgery as the removal of the appendix for the prevention of disease while doing an abdominal operation for any other cause. We are so accustomed to associating surgery with the relief of disease that it may be hard to accept it as a definite procedure in prophylaxis as well. Nevertheless due consideration, I believe, will convince one that the only difference between this and the surgery of periodontoclasia is that the latter is more complicated and done solely for the relief of disease instead of its prevention.

Coincident with surgery comes the consideration of therapeutic agents to be used, and, while such remedies have little or no place in the prevention of mouth disease, they may be given fourth place in an established routine.

While disinfectants and antiseptics are necessary in the presence of either diseased or wounded tissue, such agents are not important in prophylaxis, except, perhaps, for their protecting influence against acid-forming organisms, provided, of course, their action is not a positive detriment to health. Therapeusis of the mouth, therefore, should at all times contemplate the use of only the simplest agents which will stimulate the tissues to function normally. A wash, which may also be used as a spray, composed of isotonic sodium chloride as a base, with a one per cent. aqueous solution of benzoic acid and sodium borate in water-soluble menthol, will flush out debris, insure sufficient flow of saliva, tend to inhibit pathogenic organisms, and induce better care of the oral tissues. A two and one-half per cent. saline solution with lime-water also may be used to good advantage. There is certainly no place in this field for highly alcoholic or astringent preparations.

Another simple agent which may be used as a precautionary measure in connection with the operative and surgical removal of deposits, is the well known disclosing solution composed of iodin crystals, 50 grs.; potassium iodid, 15 grs.; zinc iodid, 15 grs.; glycerine, 4 drs.; water, 4 drs. In addition to using this as a disclosing agent, instrument points dipped into the solution are rendered more sterile. This is especially favorable in case of subgingival work, not alone for its germicidal effect upon instruments but protective influence against the pushing of infection, which is always present in the gingival crevice, directly into the soft tissues. The only objection to this preparation is the fact that it discolors instruments, but as this is slight it is not to be considered seriously when compared with the many advantages. Other simple agents may be used in a similar manner to advantage in some cases if one prefers such practice. For instance, in prophylaxis against Vincent's angina, in addition to using seven per cent. chromic acid as a swab, it may be carried to place on all instrument points which work underneath the free gingivæ.

As a rule, the best therapeutics are water, fresh air, sunshine, exercise, rest and diet. These having more to do with general health are basic, and when combined with a simple, though definite mouth toilet prove to be all sufficient as adjuncts to operative and surgical prophylaxis.

Fifth in the routine of preventive practice is orthodontia. This comprehends the proper alignment of teeth to restore normal occlusion and septal space. The correct position of the teeth in the arch has much to do with their freedom from disease, and favorably influences the health of the investing tissues. It is not possible for a patient to keep an irregular set of teeth in a sufficiently hygenic condition to overcome the invitation to disease caused by trauma, faulty contact points, and insufficient septal space. Even the slightest malposition should be noted and corrected if it in any way predisposes the parts to disease. The more aggravated cases demand the attention of one well versed in the science of orthodontia, and should be referred to a specialist in such practice rather than have the patient submit to compromise in results. The simple cases, such as rotating or shifting individual teeth without interference with other parts of the arch, may well be done by the specialist in prophylaxis. At any rate this is a most important part of prophylaxis and should not escape the attention of any one who appreciates the fundamentals of mouth health.

Sixth and last, but by no means least of the aggressive procedures, is the mechanical, which has for its part splinting, crowns, and bridges.

Splints are necessary occasionally to prevent disease as well as more frequently to aid in recovery. They may be either removable, or fixed, and of necessity must be either temporary of permanent. Preference, however, should be given the removable temporary splint, unless it takes the form of a bridge, for hygienic reasons, and the further fact that each tooth should be so fixed in its position as to withstand disease of its investing tissues and the tendency to shift.

Crowns are necessary, of course, to supply lost tooth structure and at the same time restore contact points and occlusion. The restoration of the latter two is wholly prophylactic and therefore most essential, while the former is only esthetic. A crown which does not conform to the demands of nature in every particular will in time induce disease, and for that reason has no place in the practice of preventive dentistry.

Bridges act as permanent splints and when properly designed and applied restore occlusion, thus bringing unused teeth into service which is an important factor in health, and in every way should supply the normal functions of natural teeth. What may be the disastrous effect of poorly-constructed and adjusted crowns applies in a proportionately greater degree to bridges, therefore the relation of this branch of practice to that of prophylaxis is very great. These restorations are either fixed or removable, and great care should be exercised in the selection of which principle to use in any given case.

Seventh is the obligation of instructing every patient in the proper use and care of the mouth. While this may not be termed strictly aggressive it is certainly progressive, and as such must be considered a most important part of practice. In fact it is half of our responsibility as dentists, no matter what branch of practice we engage in. Before expecting intelligent cooperation from patients, we must wholly discharge the obligation of applied instruction by actually demonstrating in the mouth all procedures advised for the preservation of its health. All efforts to educate the patients up to a proper appreciation of a healthy mouth and the responsibility which they must necessarily assume in respect to its care, should be coincident with any and all other services rendered. Such instructions should be repeated and even supplemented, if necessary, before finishing each patient, and for that reason may be assigned seventh place in the routine of prophylaxis.

Of the many things pertaining to the mouth toilet one may consider necessary for patients to know and do, the following are the most important: Use of teeth, use of tongue scraper, selection, use and care of the brush, selection and use of floss tape, selection and use of picks, selection and use of dentifrice, selection and use of mouth wash and the necessity of frequent visits to the dental office. It always is advisable, as mentioned, to include certain fundamental teachings which pertain to general health, such as balanced diet, digestion, elimination, use of water, (externally and internally), exercise, rest and fresh air, and explain how these, through their beneficial influence upon the system, prevent disease in the mouth.

All instruction must be personal and varied to suit the individual case. It should be simple and definite enough for any one to understand and do, with a precision which will be productive of good results. Remember that in this, as in all things, it is better to follow a few simple health rules well than many indifferently.

The responsibility which necessarily must rest upon the patient, though greater than that of the dentist, or prophylactician, is in a few words, the absolute cooperation in all things pertaining to submission to good professional service, intelligent mouth toilet and observance of the laws of health. Their ability to discharge this obligation is largely dependent, of course, upon the kind of instructions received.

Chart No. 2, though incomplete, shows successive steps in the organized routine of prophylaxis and emphasizes the simplicity of such procedure. Those who develop this practice somewhat in accord with these suggestions will find it easy, definite, and profitable.

CHART No. 2

- PROPHYLAXIS
  - 1. Dentist
    - 1. Examination
      - Oral
        - Buccal and Faucial Tissues
        - Investment Tissues
        - Tongue
        - Occlusion
        - Contact
        - Caries
        - Erosion
        - Devital Teeth
        - Margins of Fillings and Crowns
      - Systemic
        - Blood Picture
        - Urinalysis (Pancreas & Kidneys)
        - Heart
        - Lungs
        - Digestion
        - Elimination
    - 2. Operative
      - Correcting Traumatic Occlusion
      - Correcting Faulty Contact
      - Removing Visible Deposits
      - All Fillings
      - Smoothing and Polishing Exposed Surfaces
    - 3. Surgical
      - Removing Subgingival Deposits
      - Resecting Excessive Gingivæ
    - 4. Therapeusis
      - Local
        - Mild Saline Wash or Spray
        - Disclosing Solution, or Iodin, 2%
        - Seven per cent. Chromic Acid
        - Ten per cent. Silver Nitrate
      - Systemic
        - Water
        - Fresh Air
        - Sunshine
        - Exercise
        - Rest
        - Diet
    - 5. Orthodontia
      - Correct Alignment
      - Restore Normal Occlusion
      - Gain Normal Septal Space
    - 6. Mechanical
      - Splints
        - Removable or Fixed
        - Temporary or Permanent
      - Crowns
      - Bridges
        - Fixed
        - Removable
    - 7. Instructive
      - Use of Teeth
      - Use of Tongue Scraper
      - Selection, Use and Care of Brush
      - Selection and Use of Floss Tape
      - Selection and Use of Picks
      - Selection and Use of Dentifrice
      - Selection and Use of Wash
      - Necessity of Frequent Visits
  - 2. Patient
    - Cooperation
      - Permit Good Service
      - Intelligent and Persistent Mouth Toilet
      - Observing Recognized Laws of Health

Exchange Bldg.

SURGICAL TREATMENT OF CHRONIC MAXILLARY SINUSITIS OF ORAL ORIGIN*

BY HENRY S. DUNNING, B.S., M.D., D.D.S., NEW YORK

ON ACCOUNT of the great developments made during the last few years in oral roentgenography, and the frequency with which roentgenograms of the teeth and maxillæ are made, maxillary sinusitis of oral origin is found to be a very common disease. For many years, rhinologists have felt that the maxillary sinus was surely their domain, as they have thought in the past that anywhere from seventy to ninety per cent. of all maxillary sinus infections were descending infections from the frontal or ethmoid or from the nose itself. I believe that the majority of the rhinologists today feel that there are more ascending infections from the mouth infecting the antrum than were formerly recognized, but that still the larger percentage of infections of the maxillary sinus come from above downward.

Most of my oral surgery friends, I think, feel that the percentage of antral infection of oral and nasal origin is much nearer fifty-fifty. We, of course might say that the oral surgeon sees more of these cases originating from the mouth, and that the rhinologist sees more springing from the nasal accessory sinuses. In these days when so many patients are having their teeth roentgenographed as a matter of routine whether they are in trouble or not, latent antral infections are found, and many teeth are removed whose alveoli enter the antrum on gentle curettage. On the removal of many of these teeth, it is found that there is a chronic low-grade infection present in the antrum that has been draining comfortably through the middle meatus for months. This mild infection has taken care of itself very nicely, and the condition has never become acute. We are today giving a great amount of thought to the peridental structures, to the maxillæ and also to the mandible. We are ever on the lookout for bone cysts, neoplasms, necrosis and infected areas, etc. Few teeth today are extracted by the careful practitioner without being roentgenographed first. The condition of the bone is known and the bone is often curetted and rongeured *even though the antrum is opened.*

I have had many cases during the last year in the hospitals and in private practice in which I have had to make a wound in the maxillæ that has caused the mouth to communicate freely with the antrum. In many cases, the antrum has been found to be infected.

When the operator has by force of circumstances made a good sized oral opening into the antrum, and has found the antrum diseased, there are two main factors in the subsequent treatment which should appeal to him. These are: *First*, cure of the antral disease as soon as possible, and *second*, closure of the communication between the mouth and antrum at an early date.

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*Read before the Section on Stomatology (A.M.A.) of which by special arrangement THE DENTAL SUMMARY is the representative organ for the dental profession.

If we study the physiologic function of the maxillary sinus, and also its anatomy, we find that the antrum was intended to communicate normally with a comparatively clean cavity, the nose; that the nose and the antrum are lined with the same membrane, and that about the same bacteria are found in these two cavities, the nasal and the maxillary sinus. It is evident to the casual observer that nature never intended the mouth and the antrum to communicate, and never intended the mixing of their different bacteria and secretions.

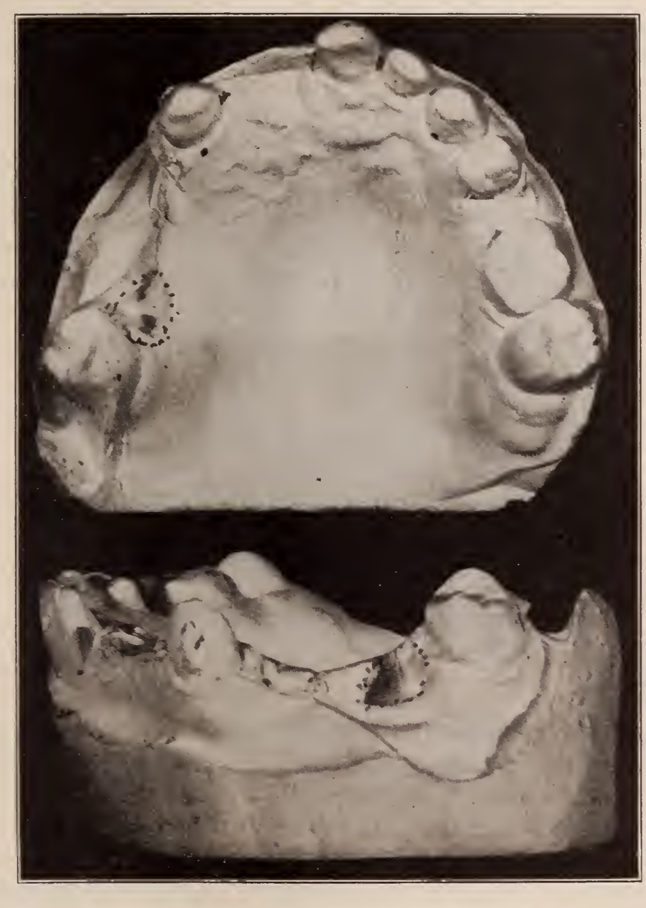

Fig. 1—Models of superior maxillæ with openings in alveolar process communicating with antrum. These were closed by flap operation.

It has been proved clinically that a permanent opening from the mouth into the antrum may produce an ascending infection into the maxillary sinus, later causing a pansinusitis; yet how often do we see the antrum, in these chronic infections of oral origin, irrigated for weeks through the opening in the mouth and packed with gauze? Why should a large oral opening into the antrum be permitted to exist? The mechanics of this treatment is wrong. It is analogous to the housemaid's sending her sweepings from the cellar through the parlor with its dainty hangings rather than sending the dust from the parlor, a comparatively clean room, through the cellar, generally not too clean, to the back yard. A gauze drain inserted into the antrum from the mouth often draws up secretions from the mouth by capillary attraction as does a wick in a lamp, and frequently reinfects the cavity one is trying to cleanse. Up to a few years ago, text-books were advocating the extraction of a tooth through which to treat a maxillary sinus infection. These books did not stipulate the removal of a diseased tooth that was causing the antral infection, but often a healthy one for drainage purposes only. The sacrifice of a healthy tooth in the old days meant nothing, and the establishment of the communication between two cavities containing different secretions and bacteria was approved of. This method, known as Cowper's, is not advocated now by many authors, although it is often mentioned.

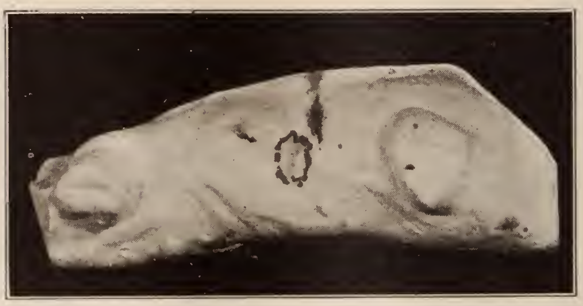

Fig. 2—Model of superior maxillæ with opening in alveolar process communicating with antrum.

The etiology of maxillary infections in the past has not been carefully considered. Not a month ago, a well-known rhinologist sent me a case of maxillary sinusitis for which he had just performed a radical antral operation. I was told that there was "a sort of 'gum boil' over the second bicuspid," and was asked to treat it. My roentgenographic films disclosed a decided shadow extending to the antral boundary over the second bicuspid, which was a nonvital tooth. Under procain I removed the tooth, and the curet entered the sinus very readily. On exploring the so-called "gum boil" above the tooth, I found it led to necrotic bone. Most of the alveolus of the offending tooth was removed, and an area of dead bone as large as a penny was removed from the anterior wall of the antrum after a flap of the soft tissues had been turned back. I do not believe that this case was properly diagnosed in the beginning before the first operation. There was some diseased membrane over the end of the infected bicuspid, and I am quite sure that the antral infection would not have cleared up in many months, if ever, without some surgical treatments being given to the infection of the alveolar process. The type of infection should be diagnosed early, before treatment is begun, and this cannot be done accurately without taking oral roentgenographs in conjunction with the anteroposterior plates showing the sinuses. If the infection is a descending one from the frontal or ethmoid sinuses, the case naturally belongs to the rhinologist, and in some cases to the oral surgeon, if he is familiar with these sinuses.

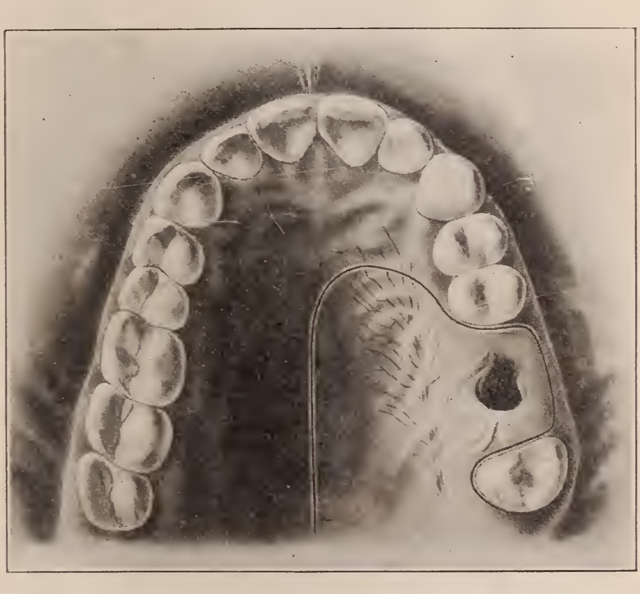

Fig. 3—Outline of flap and also posterior palatine artery which supplies flap well with blood.

If the infection is an ascending affair from the maxillary bones and teeth, it *cannot* be cured alone by the rhinologist unless he is familiar with the mouth and dental structures. In either of the foregoing cases, the cause of the infection must be removed; and if the case is a chronic one, the antrum must be cleaned by a gentle curettage and sometimes by removing the lining membrane, and must be irrigated and drained properly. In nearly all of these cases, the sinus should be irrigated with warm saline through an opening under the inferior turbinate, and if the infection is of oral origin, the washings drain downward into the mouth. If the case is not of oral origin and there is no opening into the mouth, of course the washings naturally return to the nose and are discharged through that cavity. I do not see why the mouth opening in the oral cases should be packed in any case more than a few days, even if the suppuration has not ceased and although the tissues around the oral opening are not in sufficiently healthy condition to bear sutures. In many cases, it is advisable to close mechanically the oral opening for a time on account of the suppuration. In these cases, the mouth and the maxillary sinus should be separated by a well fitting "saddle-plate" that does not press at all on the edges of the wound leading into the antrum. No plug or projection that enters the opening should ever be used. I cannot condemn too severely the use of any appliance that tends to establish a permanent opening between these two cavities. This

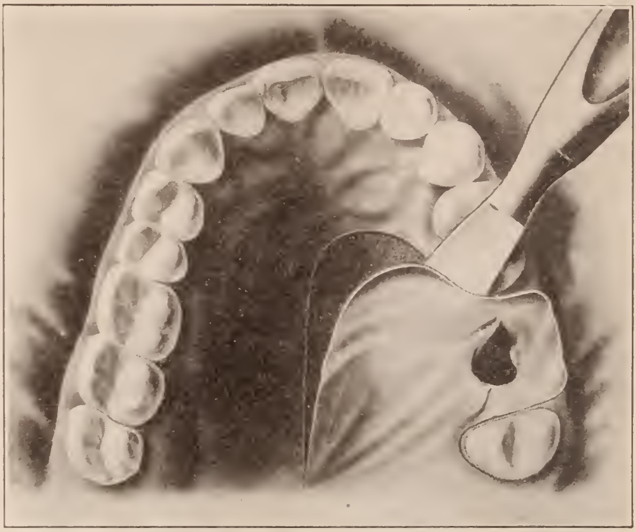

Fig. 4—Releasing of palatal flap; orifice of typical mouth opening into maxillary sinus.

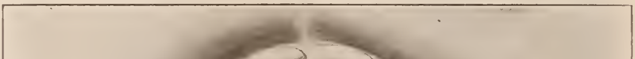

Fig. 5—Palatal flap released and tucked under labial flap. This method insures a stronger union of the two flaps than the edge-to-edge procedure. The mucous membrane of the palatal flap must be removed when the flap is slipped under the labial fold.

plate is best made of rubber, and covers over the labial and palatal surfaces of the alveolar process, and is generally held by clasps. Of course, this is a temporary affair, and is to be worn only until the suppuration has subsided and the plastic repair of the opening can be accomplished. This plate, in a way, acts as the valves of the heart. It allows of drainage from the antrum downward with gravity under the plate into the mouth, but prevents the seepage upward of the oral secretions into the maxillary sinus. These plates, if constructed properly, never block the drainage, and keep the antrum cleaner than any gauze drain can possibly keep it.

In searching the literature, we find little mention of any operative procedure for closing off an opening from the mouth into the maxillary sinus. Little attention has been given to the fact that the mouth and the antrum are two very unlike cavities, that their secretions and their bacteria contents vary greatly, and that they are much better neighbors when they are separated by a barrier of healthy tissues. In cases in which the opening persists between the two cavities, the only permanent method of closing the communication is by means of a plastic operation. I have closed many openings into the maxillary sinus by undermining the soft tissues around the edges of the defect, and then drawing the tissues together. This procedure will suffice in some cases, but in the majority of cases in which the opening is of considerable size, this method will fail, as the sutures will slough out, owing to tension. Dean[1] has described an operation for closure of the opening between

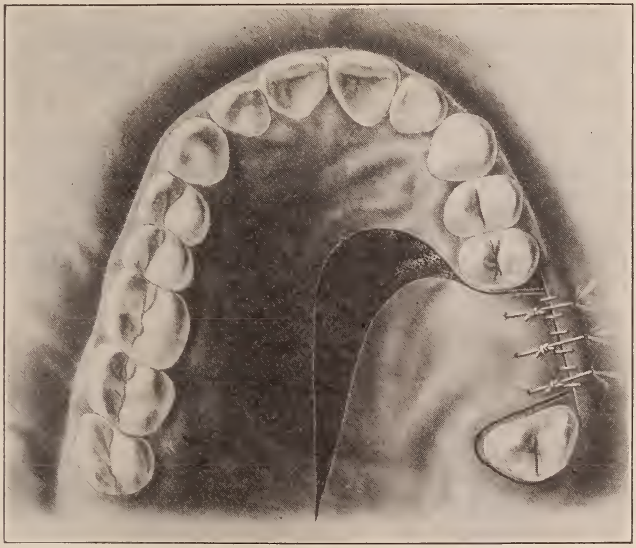

Fig. 6—Flap sutured together, and final stage of operation.

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[1] Dean, L. W.: A Method of Closing a Sinus Between the Antrum of Highmore and the Mouth, *J. A. M. A.* 61: 1513 (Nov. 1) 1913.

the mouth and the maxillary sinus. He does not make very clear the arrangement of his flaps, but explains in detail his method of suturing and the materials used.

Infections of the maxillary sinus are often not diagnosed by the dental surgeon and are frequently poorly treated. After all that has been written on this subject, it is pitiable to pick up a modern dental journal and to read in a recent number an article advocating the use of the rubber plug, and further to read that "the plug in the antral opening helps to hold the plate in place."

I once had a patient in the clinic who had suffered for years from a chronic maxillary infection and who had been treated in Vienna for this trouble. What the early treatment was in this case was vague, but for thirteen years he had been wearing a plate with a large plug projecting into the antrum. The condition of that antrum was remarkable. The cavity was almost obliterated by thick polypoid tissue, and, needless to say, it was badly infected. The lining membrane was more like leather than the normal tissue, and often the patient had to relieve conditions by irrigating through the opening himself. He always carried a syringe with him, he told me. It was difficult to clean out this sinus, after it had been reinfected by the mouth for thirteen years, and the closure of the opening into the mouth was not easy.

For the closing of oral openings into the maxillary sinus, I advocate the operation described below, but I do not claim that it is original with me.

TECHNIC OF OPERATION

A flap operation was found to be the best, after several failures in trying to bring the tissues together. In closing over large openings I found that a flap from the labial tissues often was not very satisfactory, in that it was difficult to get enough tissue at times, and also that the tissue obtained was not very strong. The palate was turned to early in my experiments, and I am not sure whether I adopted the idea at Queen's Hospital, England, during my three months' stay there or not. It is now the only flap I use, and I feel that it is the most efficacious one. The tissue is thick and tough, and pares off evenly and easily. As shown by the illustrations, a palatal flap is taken, extending from the median line at the junction of the hard and soft palates anteriorly to about opposite the bicuspid teeth. The flap is thoroughly separated from the palate down to the periosteum, but the latter is not disturbed, as this allows for better granulating in of the defect caused by the sliding of the flap outward over the opening that is to be closed. The flap just described is very thick and, of course, is well nourished, as it has in its base the anterior palatine artery. The next step is to free the outer edge of the flap, and to free the opening to be closed of all soft tissue down to the bone. Any sharp edges of bone must be smoothed off, and often the alveolar process trimmed so that the flap will more than cover the opening without any tension, when sutured to place. The labial soft tissues are now very thoroughly undermined and freed, often upward to the extent of an inch or more on the anterior surface of the superior maxillary bone. The periosteum is not disturbed here either, and a very nice curtain of soft tissue is dropped to meet and overlap the original flap from the palate. Sometimes the anterior border of the labial curtain just dropped is freed so that a labial flap is thrown over the palatal one. This is done when the opening into the antrum is a large one. The palatal flap can be tucked under the foregoing labial curtain, or can be sutured over the curtain after the curtain has been sutured to place over the bony opening to be closed. It does not matter much which way one disposes of these flaps, if they are made to overlap each other like a double-breasted coat and sutured securely. It matters little what material is used in suturing. I have used silk, horsehair and other materials, but prefer the horsehair and like it fairly heavy. The secret of success in this operation, as in all plastic operations, is to have plenty of tissue, no tension and good blood supply. I have not had one of these operations fail to close nicely the opening into the antrum, and it has become with me now the routine method of closing these annoying communications between the maxillary sinus and the mouth.

REPORT OF CASES

Case 1—B. S., a woman, aged 23, with a large opening into the right antrum, due to extraction of the first molar; had had a large abscess of the first molar three months before coming to the clinic. The dentist removed the offending first molar and curetted freely the alveolar socket, leaving a large opening into the antrum. The antrum was very foul and the opening was packed with gauze intermittently for three months. The patient had had tuberculosis from three to four years before. Under local anesthesia I curetted gently the maxillary sinus, not removing the lining membrane, and irrigated the cavity daily for ten days. At the end of this time the antrum was quite clean, and a flap operation was performed. The wound healed immediately; there was no suppuration except around the sutures for a day or so. I irrigated through the nose three times to be sure of no accumulation of any infective material. Recovery was uneventful.

Case 2—G. B., a man, aged 30, with infection of the maxillary sinus; had an abscess of the upper right second molar; the surrounding bone was diseased and there was a considerable area of necrosis. The second molar was removed but the antrum infection did not improve. This condition had continued for several months before the patient came to me. Under local anesthesia I thoroughly curetted the antrum, removing some polypoid tissue, but not removing the lining membrane. This was done through an incision over the canine fossæ. The wound was sutured and then all necrotic alveolar process was removed with curet and rongeur. The antrum was closed by a flap operation. Several subsequent antral irrigations were given through the nose. The wound healed quickly. There was no infection.

Case 3—O. B., a woman, aged 40, with pain in the upper right jaw, had a slight discharge of pus through a small sinus in the first molar region. The patient had had some very poor bridge work inserted six months previous from the second molar to the first bicuspid. This bridge was always loose and painful and there was a discharge of pus from a small sinus under the bridge. Roentgenoscopy revealed a large area of infection over the second molar extending to the first bicuspid. The patient had always been poorly nourished and more or less ill. I removed the second molar, the first bicuspid and the canine with the bridge attached; laid back the soft tissues labially and from the palate; rongeured off much roughened bone, causing a large opening into the antrum over an inch in length; curetted the antrum thoroughly, removing much polypoid tissue; brought the soft tissues together as close as possible; inserted an iodoform drain, and irrigated and changed the drain daily for about ten days. The posterior part of the floor of the antrum was still wide open. The saddle plate was made to keep out food; the plate was worn for two months, with occasional washings through the nose. A flap operation was then performed, and it healed nicely. Two months' time was allowed to let Nature close off the opening as much as might be before operating.

Case 4—E. S., a man, aged 50, with a large opening into the antrum in the region of the second molar; had had an abscess of the second molar about one year before. The tooth was extracted and its alveolus was curetted, leaving an opening the size of the end of a lead pencil into the maxillary sinus. This had been discharging for about ten months. No treatment except occasional packing with gauze had been given. Roentgenoscopy revealed much diseased bone. The past history was negative. I laid back the soft tissue and rongeured off much diseased alveolar process, opening the antral floor for about one inch. Through this opening I curetted the antrum thoroughly and removed much polypoid tissue. I irrigated and closed the antrum by the flap method. I washed through the nose occasionally. The wound healed nicely. The antrum was completely shut off.

Case 5—E. L., a woman, aged 25, with an opening into the antrum; had had an abscess of the second molar of the upper left side for six months previous to her coming to me. The alveolar process had been curetted, and there remained a persistent opening the size of the end of a lead pencil. The maxillary sinus had been infected but had been cured by the rhinologist who sent the patient to me. He had treated antral suppuration through the nasal route for forty-five months, but said that the opening into the mouth was not getting any smaller. The history was negative. As the maxillary sinus was cleaned and all the tissues were healthy, a flap operation was performed at once. Healing took place virtually by first intention and the opening closed permanently, although the mouth and the antrum had been in communication for about six months.

Case 6—J. F., a man, aged 50, with an opening into the antrum, had an abscess in the upper first molar on the right side for about a year. The antrum was badly infected then, but by constant treatment by different men it became cleaner. The patient came to me with iodoform packing which had been used intermittently for eight months. He was a traveling man, and this was a great inconvenience to him. He carried his own outfit of gauze and instruments, and packed the cavity himself generally daily. He had always had bad teeth. I washed out the antrum daily for a few days through the nose and then performed a flap operation from the palate. I did not get my mucous edges arranged very well and had to perform a secondary operation to make the antrum tight. There persisted a little crack or slit through which the patient could force fluids. The secondary operation consisted in freshening the edges of the crack and suturing them together. The wound healed nicely.

REFERENCES

Hurd, L. M.: Radical Treatment of Maxillary Antrum, *Int. Dental J.*, March, 1905.
Richards, George: Ann. Otol., Rhinol. & Laryngol., March, 1905.
Skillern, R. H.: Maxillary Sinus from *Dental View*, Philadelphia, 1911.
Dawbarn, Robert: *Items of Interest*, July, 1900.
Harris, Chapin: Discussion on Diseases of Maxillary Sinus, 6: 80.
Jackson, Chevalier: Laryngoscope, October, 1906.
Skillern, R. H.: J. Laryngol., Rhinol. & Otol., January, 1916.
Mayer, Emil: Diseases of Maxillary Antrum: Diagnosis and Treatment, Laryngoscope, December, 1904.

CONCLUSION

In closing, I should like to make a plea for better diagnosis in these cases; to urge that drainage through the nasal route be used in the majority of cases, and that the communication between the antrum and the mouth be closed as soon as possible.

THE RELATION OF DENTAL SEPSIS TO GENERAL DISEASE*

BY LOUIS A. LEVISON, M.D., TOLEDO, OHIO

A FOCUS OF INFECTION has been defined as a localized or circumscribed area of tissue which has been invaded by pathogenic micro-organisms, and which may or may not be giving off these pathogenic agents into the blood or lymph stream, to cause local or general manifestations of disease. However, the manifestations of disease may be caused by the toxins of the organism involved as well as by the actual micro-organism which has been freed into the blood or lymph stream. Clinical experience makes it very apparent that many symptoms of disease such as severe muscular or joint pain may be caused by the toxins of an organism without any actual bacterial invasion. The fact that certain organisms do not produce soluble chemical toxins in the sense of the tetanus or diphtheria bacillus has been pointed out in this connection. However, the problem of disease manifestations in relation to chemical toxins or bacterial bodies is not a simple one, because the phenomena included and understood by the expression allergy and anaphylaxis are concerned and play a role.

Focal infections may be situated anywhere in the body, and between their locations and the manifestations of disease produced, there may be definite relationships. It has been pointed out that the greater number of areas involved are in communication with the mucous or cutaneous surfaces. There is no advantage in enumerating here all the places liable to infection because they include all the tissues in the body. However, the popular custom which has grown up of considering the tonsils, teeth, and sinuses as the only localities to be included has no justification. The multiplicity of the locations actually to be excluded renders the task one of great difficulty, and it should be approached in a manner more or less systematic. The various structures of the head should be examined, the respiratory and cardiac structures, the gastro-intestinal and biliary apparatus including the rectum, and the important field of the genito-urinary organs which offers separate problems in the two sexes.

Mistakes often are made by the assumption that a discovered focus of infection must necessarily stand in a causal relationship to a particular condition which is being investigated. There are few adult individuals in which some infection may not be demonstrated by a searching examination. This problem of relationship is to be approached not by rule but by weighing each individual case with judgment and caution.

It is indeed unfortunate that the limitations of our present knowledge in bacteriology does not permit the relationship between a certain clinical process and a suspected focus to be definitely established. Although it is true that the first wave of enthusiasm in regard to the importance of removing all discoverable infection is now passing, it is only too evident that the role of infections in the causation of disease is so well established that its clinical practice should not be endangered by emotionalism or sentiment. The physician or dentist who attempts to discredit the relation of localized sepsis to disease because of the failure to secure therapeutic relief in one or more individual cases only demonstrates his superficial knowledge of the problem. Physicians and dentists are learning that there is a human equation in the problem as well as one of bacteriology. Theoretically it may be desirable to remove every infected area from the body, but practically this is neither possible nor desirable. Infected teeth should be viewed in precisely the same light as an infected area elsewhere. Every chronic infection of the appendix, gall-bladder or prostate is not removed routinely just because it is known to exist, and by the same token every suspicious tooth should not be removed without cause.

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*Read before the Toledo Dental Society, 1920.

It is difficult and often impossible to say that certain infections and clinical manifestations of disease stand in the roll of cause and effect. It is assumed too often that the proof of such a relationship lies in the cessation of the disease manifestations following the removal of the suspected focus. It happens only too often that the removal of the actual focus is not followed immediately or at all by the expected or wished for clinical improvement. The absence of such a result can in no way be said to disprove the relationship of cause and effect. This is because the infection which has become secondarily localized in a certain area may persist even after all the primary infection has been removed.

The list of organisms which may result in disease processes following local infections is limited only by the number of different types of pathogenic organisms. Practically the only exceptions to this rule would be those organisms that destroy the host at once on account of their virulence. The various types of streptococci including the hemolyticus, viridans, rheumaticus, and mucoceus are commonly found, and also the staphylococcus, colon bacillus, gonococcus, and the pale spirochæte. One of the most confusing problems to be worked out is the question of multiple areas of infection often from different types of organisms. Here it will require sound clinical judgment to determine the proper course of action. The well known influence of one organism upon another may come into play in modifying, activating or inactivating the course of the infection. Also the conditions under which an infection exists in the body are of the greatest importance. It is well known that many infections exist in the body for long periods of time and as far as can be determined remain latent or inert. However let the host be subjected to any condition which lowers his resistance of vitality, such for example as diabetes, an infection although formerly trivial becomes endowed with dangerous possibilities. The list of conditions which may impair the resisting power of the host include the usual vicissitudes of life, physical or mental, improper housing conditions, lack or excess of food, harmful industrial conditions including exposure to and contact with dusts, chemical fumes and irritants, cold and heat, sudden changes of temperature, excessive use of drugs, alcohol or tobacco, abnormal diathesis, protein sensitization, gout, diabetes, senility, various metabolic disturbances and many others. It is this variability in the host which in part accounts for the different types or courses which any infectious disease may run. It is evident from this that it is not sufficient for the dentist to diagnose infected teeth, but like the physician he should know the conditions and environment under which the patient lives and works, because this and not the infection *per se* may determine the proper course of action. If the dentist does not investigate these conditions himself, he should trust to the cooperation of the physician to be so informed.

Passing from these general considerations to the particular question under discussion tonight, namely, the role of dental sepsis in the causation of disease, I may say at the outset that the arrangement of the program implying a dental side as opposed to a medical is not justified. The dentists and medical men should be in entire accord if the patient is to be properly treated. The only difference between them should be in the respective fields of their work. Whatever differences there are now between them can be referred to the training and education of either or both. There are many men in both circles who have been trained in the days when bacteriology was either unknown or practiced more in the breach than in the observance. I am very positive in my impression that the differences in methods of handling infected teeth are not divided in dental and medical camps, because there is by no means uniformity of belief or action in either group. In both groups there are numbers of men who disapprove of the entire subject mainly because of the disappointing results clinically following the removal of infected foci. This disappointment when it takes the form of disapproval of the entire subject is only an evidence of the inadequate understanding of the subject and the bacteriologic problems involved.

Each case must be solved not by a general rule to remove all suspicious teeth routinely and in a wholesale manner, but by a process of sound reasoning and judgment which comes to the conclusion that the systemic condition of the patient is either imperiled or may become so by the continued presence of the suspected teeth. The probability of future damage to systemic organs, especially when it concerns such vital organs as the heart or kidneys, should be weighed carefully in making a decision in regard to the removal of infected structures, whether it may be teeth or any other. This implies that the dentist often should rely on the judgment of the physician in mapping out his course of action, and not be guided solely by the appearance of the suspected focus itself. A grave systemic condition justifies a radical procedure which would not be warranted by trivial aches or pains. It has been said that the chief object of dentistry should be the maintenance of health. Dentists never can attain this object if the teeth are not regarded as inter-related with other systemic structures and their diseases. The dentist who does his work only with the view of the cosmetic effect produced, need not be considered here at length, because his work will be condemned generally by all progressive dental surgeons.

Great numbers of dentists have been brought to confusion and uncertainty by the difficulty of management of patients in whom the X-ray shows some indefinite shadow at the roots of the teeth or some bony erosion. Dentists may be consoled in this respect that there never can be entire uniformity of interpretation by either the X-ray man or the physician. Proper interpretation is a fine art and to a considerable degree involves a personal equation. As mentioned above, it is not so much the mere appearance of all lesions which determines the course of action as the broader problems of the relationship between the lesion and the systemic manifestations of disease. It is possible to justify the point of view that it is better to make a mistake by extracting suspicious teeth than to run the risk of the continuation of a disease process. It need not be said that the size of a lesion does not determine the damage it does. The virulence of the organism and the condition of the host are the determining factors rather than the mere size of the X-ray shadows.

It is interesting to point out here a few clinical observations in connection with dental sepsis based on reported statistics. Bad teeth are not so likely to cause systemic disease in children as in adults. The tonsils are more important factors in early life. It has been pointed out also that there are relatively fewer alveolar abscesses among the poor than among the so-called better classes of patients. The reason is advanced that aching teeth are more promptly removed among the poor who are not so concerned with cosmetic effects.

It is apparent at this time from the clinical experience of both dentist and physician that caution should be displayed in promising relief to the patient after the extraction of teeth, or for that matter any suspected focus of infection. The focus which has been removed may be the evident one, but the secondary area of infection which has been established may persist and continue the symptoms of which the patient complains. An infection of a joint may continue after an infected tooth or tonsil is removed, but this in no way impairs the validity of the working theory that the tooth or tonsil was the original infection. It may indeed be impossible to eradicate the infection secondarily implanted, but the source has been removed, so that whatever resistance the patient may bring to bear may not be wasted on the original focus itself. The question of multiplicity of primary foci also should be considered in promising relief after the removal of certain foci. There may remain in the tonsil, for example, a streptococcus infection after infected teeth have been removed, and this may prevent complete relief from the systemic condition of which the patient complains. An infection originating in a certain focus may become soundly fixed in the tissues secondarily involved, so that relief is slow or entirely absent. If a joint has become involved, the actual destruction of tissue may produce pain and discomfort from mechanical reasons alone, even though the infection has been eradicated. It should not be forgotten also, that a heart valve or kidney which has become secondarily infected, may in time take on the characteristics of a distributing focus of infection and disseminate the organism broadcast through the blood stream.

The problem of curing dental sepsis without the extraction of teeth is a question that is particularly dental rather than medical. The absence of marked success in this endeavor need not be pointed out. However, the medical man may presume to point out that much time is often lost by the dentist in conservatively treating infected teeth in individuals, who by virtue of some systemic or debilitating disease have not the power to resist infection well. It would seem to be desirable for the dentist to enlist the aid of the medical man in order to improve the general condition of his debilitated patients before wasting much time and energy in treatment.

The relation of dental sepsis to dental work is too well known to require pointing out here. The frequency of infections in devitalized teeth has focused the attention of investigators and clinicians upon dental technic. The dentist who knows that his work may be criticised by any one who has access to the X-ray machine is less inclined to take cosmetic effect as the sole criterion of his labor. The prevention of disease is a function of the dentist as well as the physician. That class or type of individual who chooses to retain his infected teeth in the full knowledge of the possible systemic results can not be taken as an example of criticism of dental work. The problem of dental sepsis in relation to disease is now passing through the same cycle that comes to most new discoveries. The pendulum swings from one extreme to another. It may run the gamut of many different forms of acceptance in various quarters. There may be popularity or abuse, belief or incredulity, but finally the truth becomes patent and persists. Perhaps we are too close to the scene to see the final picture.

Were the dental man always thoroughly grounded in the principles of bacteriology, pathology, and the principles of disease, the disposition of infected teeth could with propriety be left to him as a specialist. However, in the present state of affairs, consultation with a physician who should be equally well grounded in the above principles is both proper and necessary. When the physician can no longer maintain his position that the health of the patient may be imperiled by infected teeth, then may the dentist bring the question of cosmetic effect to the foreground. However, cosmetic effect never should be permitted to sway one's judgment when there are sound reasons for believing that systemic disease may affect the patient. It may not always be possible to convince the patient that the dentist's judgment should be carried through to its logical conclusion, but here the fault is not with us.

The fact that dental infections are in the main so easy to demonstrate by means of the X-ray is one reason why teeth have been blamed for so much trouble. The demonstration of impairment of structure is here concrete and definite. This is not so in the tonsil, sinuses and many other structures. It is perhaps natural that the first place under suspicion should be the first point of attack. Also, removal of teeth, removal of the gall-bladder, appendix, tubes, or prostate. It is indeed no more logical to remove the one than the other were the practical objections to be outweighed.

Progress toward the solution of this problem will come from experience and time. There is no definite and fixed course of procedure. The only things that are essential are that the dentist and physician be well trained in their respective spheres and be conscientious in their effort to promote the well-being of the patient, rather than have a temporary satisfaction from cosmetic effect. Every case should be handled as a separate problem, based on sound clinical reasoning and judgment, and not by prejudice or arbitrary, routine action. Controversy and argument never will settle this problem, either in regard to diagnosis or treatment. Those points which have been generally accepted by the better men in each profession should become common knowledge. A willingness to cooperate will satisfactorily account for the remainder of the disputed issues.

421 Michigan St.

AMBITION is the spur that makes man struggle with destiny. It is heaven's own incentive to make purpose great and achievement greater.

—*D. G. Mitchell.*

THE PROBLEM OF FOCAL INFECTION*

BY H. W. DACHTLER, ROENTGENOLOGIST, TOLEDO, OHIO

THE PROBLEM of alveolar abscesses and infections needs intelligent discussion at this time, as we are being forced to the conclusion that many of the diseases of hitherto unknown origin are due probable to chronic infections of the blood and blood-forming organs. Pernicious anemia, the leukemias and perhaps Hodgkin's disease come under this class; while there are many better known conditions in which chronic infection is definitely known to be the sole exciting cause.

With this more clearly understood it is quite evident that focal infections of the teeth are largely medical and not dental problems, and the physician and not the dentist is to be the court of final jurisdiction.

In the past there has been too much controversy on this subject and the physician is as much to blame as the dentist for the misunderstanding that has existed. The dentist has pointed the finger of scorn at the medical man who has had the teeth extracted from a patient with chronic arthritis, only to find that the arthritis was not cured. The dentist, because he has seen many patients with definitely-abscessed teeth, without visible evidence of disease, has often insisted that the physician is a fool to lay so much stress on dental infections. Perhaps for these reasons some of them have been unable to see clearly on the subject, while some seem hopelessly blind.

There has been so much antagonism from many of the dentists regardless of the writings of many of their leaders, that intelligent discussion of the patient's condition was impossible. If we can clear up some of the mist that has obscured our judgment in the past, it will indeed be fortunate for the laity.

In the first place it must be understood that certain medical conditions are due definitely to infection, but that dental infections are not the sole cause of such conditions. The physician who sends his patient for roentgen examination of the teeth because they are suspicious, without first examining that patient for all sources of infection, is as negligent as the dentist who allows his patients, with a number of devitalized teeth, to drift along until they consult a physician and are found with a serious lesion due to focal infection.

The physician who rushes into print with a series of case reports showing that the patients who had their teeth extracted for an infectious arthritis were cured only when their tonsils were removed, does as much harm as the physician who was responsible for the extraction of the teeth. In fact, by his writing he probably does more harm. I can cite a long list that had the tonsils removed first and were cured only when the teeth were intelligently extracted. These men were only high enough in mental outlook to see over the bottom rail of the fence.

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*Read before the Toledo Dental Society, 1920.

The problem of dental infections is a hard one from both the diagnostic and medical aspects. It is common practice by diagnostic laboratories using the roentgen-ray to make a set of ten films to cover the teeth and on these it is presumed to base a final opinion. In many cases this is sufficient, but in many medical cases where there are a number of dead teeth it is inadequate. Any roentgenologist can show cases in which three films of a single tooth were made, from one of which an absolute diagnosis of an abscess could be made, and in which the other two failed to show it definitely. This does not mean that the technic was faulty, but that it took a certain angle, many times not the normal one, to render it clearly visible. In some cases it is necessary to resort to plates on the outside of the jaw to determine definitely whether or not an abscess exists. Again, the patient's mouth may be of such shape that it is impossible to get films of some of the teeth that can be said to be absolutely diagnostic. Also, in the upper molar region, the reontgen film never may be able absolutely to rule out an abscess. Owing to the angle that the film makes with these teeth, and the angle at which the tube must be placed to show the roots at all, some abscesses cannot be detected. Again, some patients cannot tolerate films in the mouth owing to persistent gagging. Many patients are referred to the roentgenologist so ill that good films are unobtainable. Some are so crippled from an arthritis that they find it impossible to hold the film in the mouth, and some have nerve lesions that make it impossible to immobilize them during the one- or two-second exposure. There is no branch of medical roentgenology that taxes the resources and ability of the roentgenologist so greatly. Owing to the above, dental roentgen diagnosis is in the same class as the Wassermann test. Positive results are exceedingly valuable. Negative results may be misleading and therefore dangerous.

Having mentioned briefly the difficulties from the mechanical side, the more important problem of interpreting the films needs discussion.

The dental film is not a diagnosis. It is worth as much, and only as much, as the roentgenologist's judgment and experience are worth. All roentgen films and plates, if properly interpreted, are interpreted largely in the light of past experience.

Perhaps five years ago, when to make a diagnosis of an alveolar abscess at the apex of a tooth was quite likely to bring down upon the head of the roentgenologist the wrath of the patient's dentist, I ventured to assert that the roentgen study of changes in bones due to infection, had been going on for at least a dozen years, and that many problems had been worked out in that time and proved by clinical and microscopical methods. In my early dental work my conclusions were based largely on past experience with infections of the other bones of the body. I could see no reason why infections of the alveolar process should not produce the same bone changes as those produced in other bones, and be subject to the same processes of bone atrophy, absorption and repair. At that time I stated that areas of bone atrophy with the disappearance of the lime salts at the apex of a tooth always meant infection in some stage, and that the infection could be said to be eliminated only when the bone atrophy disappeared and there was a return of normal bone structure. An extended experience has served to strengthen this opinion.

Now as to the cause of these infections. Whenever the nerve of a healthy tooth is killed and the root canal filled, and the tooth shortly after shows an abscess, I am of the opinion that it *was infected at the time the operation was performed.* I have followed quite a number of these cases from the first, have seen the gradual development of the abscess, the development of secondary manifestations and their immediate subsidence following extraction of the tooth. Some of these patients had definite clinical evidence of infection such as slight chill, slight rise in temperature and local pain within twenty-four hours after sealing the root canal. Sometimes the pain had subsided within forty-eight hours and the pain and reaction were attributed by the dentist, to the operation and not to infection. Many others seen later gave a definite history of early reaction which, to me, suggested infection. *If a tooth is definitely proved to be without an abscess three months after treatment* I think it can be disregarded, *unless* the tooth is subsequently opened or receives further dental care.

Neither is the fetish of filling a tooth *to the very apex* of any consequence, *per se.* I have seen many teeth that had the nerve extracted years ago and the root imperfectly filled that were as free from abscesses as teeth devitalized today. It is probably true that a root properly filled to the apex shows more careful work and better dentistry, but it also is true that in many cases the work necessary to do this means greater danger of infection and poorer results. Of the two methods, the dentist who removes the nerve and promptly fills the canal and seals up the tooth permanently, probably will infect less teeth than the dentist who works over a tooth for a week or two, opening and sealing it a number of times.

It has been conclusively proved that bone operations require the most careful aseptic technic of anything the surgeon undertakes. Repeatedly it has been demonstrated that surgeons that can open the abdomen, with almost unfailing good results cannot operate on bones with the same technic without infecting them. This being the case it is not to be expected that the dental surgeon can enter the alveolar process without infection in many cases. He works in a room that is not sterile, and he is working over the mouth that harbors more varieties of pathogenic organisms than any other part of the body. I fancy he will be somewhat handicapped in using a face mask on his patient even if he wears one himself. It would seem that absolute asepsis is almost impossible. I cannot concur with those who believe that the infection is a metastatic one, and that it is Nature's method of removing a dead substance which the body refuses to tolerate. The way these abscesses extend from the apex of a tooth deep into the alveolar process does not warrant this conclusion.

Now, as to the danger from alveolar abscesses, there can be no question at this time. There are few physicians that have not seen the dangerous results that follow alveolar infection in many cases, and the prompt subsidence of the secondary manifestations that followed the elimination of the primary focus of infection. This has resulted in the physician many times overlooking the possibility of infection from other sources, and, where abscessed teeth are found, advising the patient that the removal of the teeth will cure the condition. Patients suffering from the effects of infection should be informed of the nature of the trouble and an honest effort made to locate and remove all primary foci in an effort to cure them. There is no reason to expect that all secondary manifestations will be cured even when the original cause of the trouble is located and removed. Those due to toxins probably will, but the active metastatic infections may not, and this is a strong argument against waiting for secondary manifestations to appear when a primary infection is located. Owing to the nature of alveolar bone, infections in it tend to enter the blood stream early and with certainty. There is no mucous membrane that tends to wall off an alveolar abscess and localize it such as are found in parts of the body that are ordinarily subject to infection, and secondary manifestations occur with greater certainty.

Now, as to the treatment of alveolar abscesses, I think most dental surgeons will agree that no tooth should be devitalized unless decay has made it absolutely necessary. When devitalized they should be watched carefully for evidence of infection. Watch the tooth long enough to be certain it is not infected, and when this is *proven* one *need not fear infection later.* Here we have one of the difficult problems in dental roentgen diagnosis. I have seen some very bad secondary infections in early cases in which perfect films showed such slight changes they almost escaped notice. Be especially careful of slight changes extending from the apex up one side of the tooth and with very little bone destruction. I have seen such cases that incapacitated the patient, and in which the patient was promptly cured by extraction of such a tooth.

From the medical standpoint the patient who is seen with evidence of focal infection must have all sources of infection located as far as possible. This of course includes the teeth. Here we will digress to point out that patients with apparently normal teeth occasionally will show a badly-abscessed tooth. In my experience this has occurred in about ten per cent. of the cases examined. This makes it imperative that all teeth be examined and not merely those known or suspected of being dead.

Partial examination of the teeth in medical cases is to be condemned. Patients think they have been fully examined; they are misled and later may mislead any physician they consult.

As the size of the abscess bears little relation to its danger, it is sometimes impossible to determine which of several abscessed teeth is doing the most harm. In the presence of serious lesions all should be removed that are definitely abscessed. If the patient does not recover we will go farther and say that all dead upper molars should be extracted as they are often much worse than the dental roentgen film indicates. However the dentist has a right to expect that other infections have been eliminated.

Where patients have serious lesions caused by or aggravated by focal infections, the dentist should not presume to advise patients not to have abscessed teeth extracted in the light of our present knowledge.

While it probably will cause a controversy, as even the dental surgeons are not in accord on the subject, I do not feel that the dentist is justified in attempting to cure an abscess by treatment through the root canal alone. While I have seen a few definitely cured by this method, it is too uncertain; it takes too long to be of service in medical cases, and the risk is too great. More can be accomplished by amputating the root, provided all of the denuded portion can be removed. This promptly stops absorption and establishes efficient drainage. Fortunately the removal of the abscessed tooth usually will be all that is necessary to effect a cure. The removal of the diseased bone by the curett may facilitate healing and is sometimes necessary to prevent localized bone abscesses from forming deep in the alveolar process.

Owing to the growing conservatism of the dentist we will not have to deal with so many of these cases in the future, but how are we to handle the old cases? In trying to give these patients intelligent advice I have come to group these conditions under three heads, viz., active abscesses, low-grade abscesses and probably inactive lesions. With the exception of the upper molars most apical infections can be divided into these three classes. Active abscesses always should be eliminated. In the low-grade abscesses the medical condition should be the deciding factor. Without doubt the conservation of the patient's health demands their removal, but in the absence of any definite evidence of disease, if the patient elects to run the risk of keeping them, they are entitled to the privilege. Probably some women always will take the risk of having their lives shortened rather than to have an incisor extracted. When patients come to understand, as they rapidly are doing, that these low-grade infections are a constant menace to health, both directly and by a lowered resistance to other infections, they probably will elect to have them removed.

While I paid little attention to it at the time, I recall vividly a statement to the writer by Sir Arbuthnot Lane, in 1913, when he said that he was convinced that infected teeth was a decided factor in breast carcinoma. In an experience in about three hundred cases I am appalled at the percentage of these cases with a number of low-grade, apical infections.

Of those classed as inactive lesions quite a number are seen. It is seldom that one is justified in ordering such teeth extracted regardless of the contention of Dr. Novitzky. The changes noted in the alveolar process are entirely different from those found in the "low-grade abscesses." Always the slight bone destruction produced has been followed by bone repair, sometimes sclerosis and no definite cavity is present. The roentgen picture, while not normal, is quite different from that of the low-grade abscess. In the low-grade abscess the pocket may be sterile or it may have become walled off. In its present condition it may be harmless. By no means open such a tooth for treatment. If you are not going to extract it leave it alone. Admitting oxygen may relight it or it may be reinfected with disastrous results.

In concluding, I want to impress upon you the value of a careful history of the dental work done. This often shows that the patient's complaint dated from shortly after some work was done on one of these dead teeth. An inactive abscess probably had become an active one.

226 Michigan St.

Rinsing the Mouth After Brushing the Teeth

It may be unnecessary to call attention to the importance of rinsing the mouth after brushing the teeth; we hope all of our readers do so.

There are many people, however, who habitually brush their teeth, thoroughly, perhaps, rid the mouth of the excess paste or powder, rinse the brush and lay it away with a satisfaction that indicates, "a good job well done." You ask one of these why he rinsed the brush and he will tell you it was because the brush was reeking with bacteria and filth that had been scrubbed from the teeth.

Ask again if he rinsed his mouth after brushing the teeth and he replies: "No, why?"

He had not realized that only a small portion of the bacteria and debris from the teeth was left on the brush, the greater part having been mixed with the saliva and distributed about the mouth to be subsequently swallowed.

These persons rinse the brush for a good purpose but neglect the more important duty of rinsing the mouth to rid it of this noxious material and prevent its being taken into the system.

FUNDAMENTALS OF OPERATIVE DENTISTRY*

BY W. H. O. MCGEHEE, M.D., D.D.S., CLEVELAND, OHIO

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THE PORCELAIN INLAY

THE USE OF the porcelain inlay in dentistry has been largely discontinued since the marked improvements made in the silicate cements. There are a few operators who are still enthusiastic about the material, and who are obtaining splendid results with it, but it is felt that with the improvements which will undoubtedly continue to develop in the manufacture and working of the silicates, porcelain art in dentistry, as far as the inlay is concerned, is largely a matter of past history.

Fused porcelain is still of great value in the consrtuction of the jacket and other forms of crown, as well as of certain types of bridgework, and probably will continue so for a long time. The difficulty of obtaining proper shades, as well as the time and great skill required in manipulation are the principal drawbacks to its use. However, it is deemed advisable to include in this work a brief description of the process of inlay construction with this material, consequently the following chapter is devoted to that purpose.

Cavity preparation for the porcelain inlay requires certain modifications of the types shown and described in the chapter on the gold inlay. The principal features of the cavities designed for the reception of this material are as follows, viz.:

Adequate access is a necessity, either by cutting or separation, or both, to allow for withdrawal of the matrix. The outline form should not follow a developmental groove, or cross a ridge at its highest point. Owing to the friability of the material, margins should be extended to points least susceptible to crushing stress. The outline form should never be circular, else difficulty may be experienced in seating the inlay into its proper position, after fusing. (*Fig. 227*). Adequate resistance form is a necessity, and maximum retention form is required in all directions, except one, until the inlay is completed, when retention should then be added in the remaining direction, by cutting the cavity walls. All line and point angles should be rounded, until the matrix is completed, when they should be deepened for retention. Surrounding walls should meet the basal wall or seat at an obtuse angle to admit the ready withdrawal of the matrix. Retention may be increased by pins, more generous step forms than for gold, double steps, extension of porcelain into pulp chambers, and similar measures. The cavosurface angle should be a right angle, or if a bevel angle exists, it should be deeply buried to afford strength to the porcelain. The cavity should be washed, first with cholroform to dissolve fatty matters, then with alcohol; and thoroughly dried before setting the inlay.

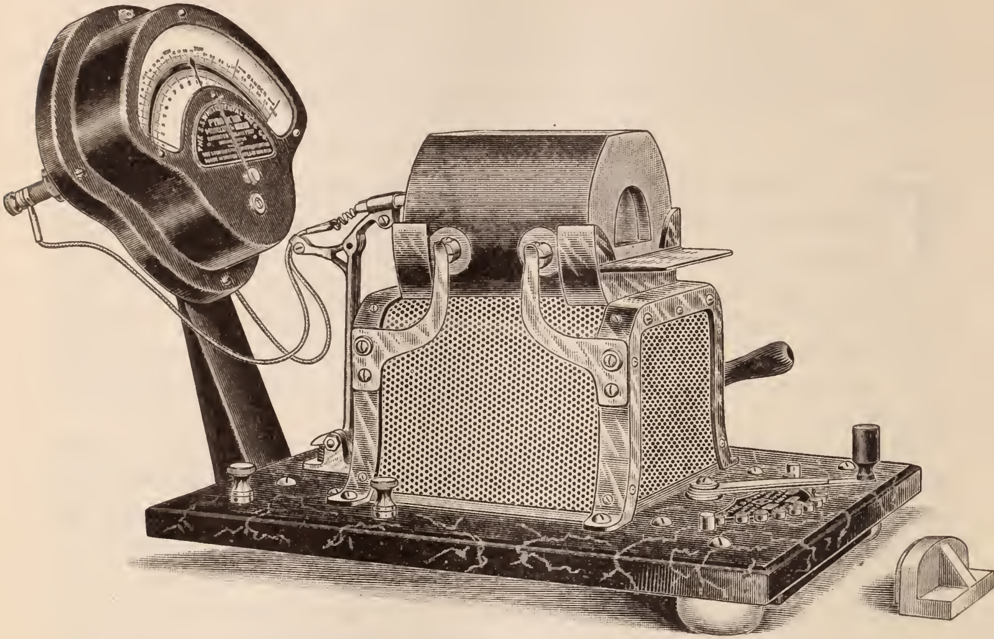


Fig. 227—S. S. White electric furnace.

COMPOSITION AND GENERAL CHARACTERISTICS OF PORCELAIN

The general composition of Porcelain for inlays is as follows: *First, basal ingredients*, such as silex, kaolin, feldspar; *second, fluxes*, such as borax, sodium carbonate and calcium phosphate; and *third, pigments*, such as gold, platinum, purple of cassius, oxid of cobalt, titanium, iron, uranium and silver.

There are two general classes of porcelain used in inlay construction, viz., high and low fusing.

High-fusing porcelain requires five minutes or more to fuse at a temperature exceeding the fusing point of gold, (2012F.) while low-fusing porcelain requires less than five minutes.

A porcelain inlay usually requires several bakings in the furnace. The first of these bakings is known as the biscuit fuse. By the biscuit fuse is meant the act of heating the porcelain sufficient to obtain shrinkage, but not enough to glaze it. The first bake should never exceed a low-biscuit fuse, subsequent bakes being fused to a higher temperature, but the final glaze being not completed until the last bake.

430. What effect has the *Fineness of the Powder* on porcelain?

The finer-ground the powder, the lower the fusing point and the greater the shrinkage.

431. What effect has the *Size of the Mass* on the baking?

The larger the mass, the greater the time necessary to fuse.

432. What is the *Percentage of Shrinkage* in porcelain bodies?

High fusing porcelains shrink fifteen to twenty-five per cent. of their volume; low fusing, from twenty to thirty-five per cent.

433. What is the difference between a *Basal* body, a *Foundation* body, and an *Enamel* body?

A basal body is composed of basal ingredients and pigments; a foundation body consists of basal ingredients together with flux to increase fusibility, and is ground coarser than enamel body, to give stability of form; and enamel body is a basal body more finely ground, containing flux to increase fusibility.

434. What are the chief *Advantages* and *Disadvantages* of the porcelain inlay?

Advantages:

Harmonious color and non-conductivity.

Disadvantages:

Friability, difficult manipulation, the cement line, impossibility to preserve freshly-cut cavity walls.

TECHNIC OF CONSTRUCTION

435. Of what material is the *Matrix* constructed?

Platinum foil, .001 of an inch in thickness for high fusing, and pure gold or platinized gold for low-fusing porcelain. The platinum foil may also be used for low-fusing work.

For obtaining the matrix, first anneal the material in the electric furnace, carrying gold or platinized gold to full red heat, (1200 to 1300F.), and platinum to a dull yellow color; then follow one or a combination of the three following *Methods*, viz.:

First, burnish directly into the cavity. Cut the foil into proper size and shape (*Fig. 228*), allowing sufficient excess to extend one-fourth to one millimeter beyond the margins of the cavity, except that in one location it may extend two or three millimeters for convenience in handling. Force the matrix carefully into the cavity (beginning at the seat of the cavity first, avoiding tearing and crumpling) by means of small pieces of spunk or chamois

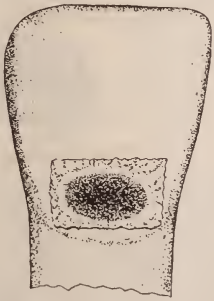


Fig. 228—Securing the matrix by burnishing into the cavity.

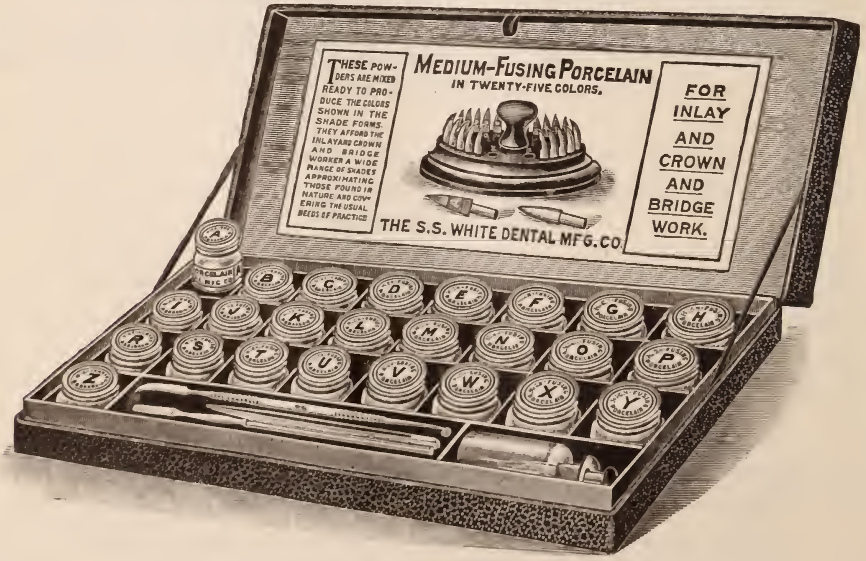
discs and smooth burnishers. Now, after removing the spunk or chamois, pack the cavity with damp cotton balls, crowding the matrix to every part of the cavity, and then thoroughly burnish the margins while the cavity is full. Now remove the cotton, and pack the cavity nearly full with camphor or inlay wax, with a large burnisher, to complete the adaptation. Next carefully remove the matrix, by means of an explorer, then immerse in alcohol to soften the camphor, or in chloroform to soften the wax. Then grasping the edges of the matrix in a pair of locking pliers, pass it through the flame to melt out the remaining wax or camphor.

Second, take an impression of the cavity in modeling compound, trimming away excess of the compound from the margins. Adapt the matrix over this with the thumb and fingers, and then force the matrix and compound into the cavity. Peel the edges of the matrix away from the modeling compound and remove the compound, leaving the matrix in the cavity, when the balance of the procedures, as already outlined, may be followed. In some cases a soft pine stick may first be forced into the cavity, to obtain an outline of the cavity, and the matrix then adapted over that, and later fitted to the cavity, as previously described.

Third, make a model of the cavity, in amalgam or cement, from a modeling compound impression, and adapt the matrix to this, completing the burnishing in the mouth.

427. How would you take the "*spring*" out of a matrix?

With the cavity and matrix well packed with wet cotton, stretch a piece of rubber dam over it and thoroughly burnish. If the spring persists, remove the matrix, anneal and repeat the procedure.


THESE POWDERS ARE MIXED READY TO PRODUCE THE COLORS SHOWN IN THE SHADE FORMS. THEY AFFORD THE INLAY AND CROWN AND BRIDGE WORKER A WIDE RANGE OF SHADES APPROXIMATING THOSE FOUND IN NATURE AND COVERING THE USUAL NEEDS OF PRACTICE
MEDIUM-FUSING PORCELAIN
IN TWENTY-FIVE COLORS.
THE S.S. WHITE DENTAL MFG. CO.
FOR INLAY AND CROWN AND BRIDGE WORK.
A
B
C
D
E
F
G
H
I
J
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M
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Fig. 229—S. S. White porcelain bodies.

Among the prominent porcelain bodies on the market may be mentioned the following, viz.:

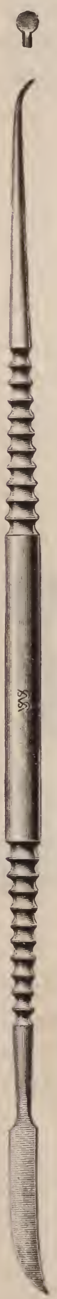


Fig. 230—The LeCron inlay carver for porcelain work.

Whiteley's	2300 degrees F.
S. S. White Dental Mfg. Co. (*Fig. 229*)	2300 degrees F.
Consolidated Dental Mfg. Co.	2600 degrees F.
Johnson & Lund	2550 degrees F.
Ash & Son	1900 degrees F.
Jenkins	1550 degrees F.

The two latter may be considered low-fusing bodies.

The process of mixing and fusing the porcelain is as follows:

Mix to a creamy consistency on a clean glass slab, by means of a clean spatula, with distilled water. Some use alcohol for this purpose. Select the proper shades, with the shade guide provided for this purpose. Lay on the body, and fuse in the furnace, in layers, to a biscuit bake, jolting the material into the matrix, and absorbing excess moisture on blotting paper, before placing in the furnace. In complex cavities, when the teeth vary in color at the cervix and cutting edge, build the body in sections instead of layers. Continue adding the body and partially fusing until the matrix is nearly full, when the last layers of enamel may be added, carved to form with an inlay carver, (*Fig. 230*), and brought to a full glaze. With low-fusing porcelain and gold matrices, the case may be invested, to prevent warping. With platinum matrices, this is not necessary. Avoid putting porcelain, when wet, into a hot furnace (*Fig. 231*), on account of the danger of producing checks in the porcelain. A small tear in the matrix, provided it is not on the margin, will do no damage, as the porcelain, if it runs through, may be removed with a fine brush before fusing. All excess porcelain should also be removed from the margins, with a brush, before fusing. The baking should be continued until proper contours are restored, trying in the mouth as often as is necessary to accomplish the result. After the final fusing, try the inlay in the mouth, and before removing the matrix, grind to the proper contour and occlusion with a fine stone. Now carefully remove the matrix. This is accomplished by dropping the inlay and matrix in alcohol or water, then carefully peeling the matrix away, first from the margin and later from the body, to prevent chipping of the margins.

The under surface of the inlay should now be etched to provide for better retention. Imbed the contour surface of the inlay in wax, and seal the margins with a hot spatula to prevent contact of acid with the margins. Dip a sharp wood stick into the wax bottle containing hydrofluoric acid, and paint the exposed side of the inlay with the acid for two or three minutes, thus etching or roughening the inlay, to provide for a better grasp of the cement. Then flood with water, remove the wax, wash with boiling water followed by chloroform, then dry, when the inlay is ready to set.

After thoroughly drying the cavity and inlay, cover the walls of the cavity and the under surface of the inlay with a good, white, sticky cement, mixed to a creamy consistency. Press the inlay firmly to place with an orange-wood stick, tapping until firmly seated, when it should be held or wedged to place until the cement is set. Finish down at a subsequent sitting, removing excess cement, dressing down overhanging margins, and polishing with fine stones and discs.

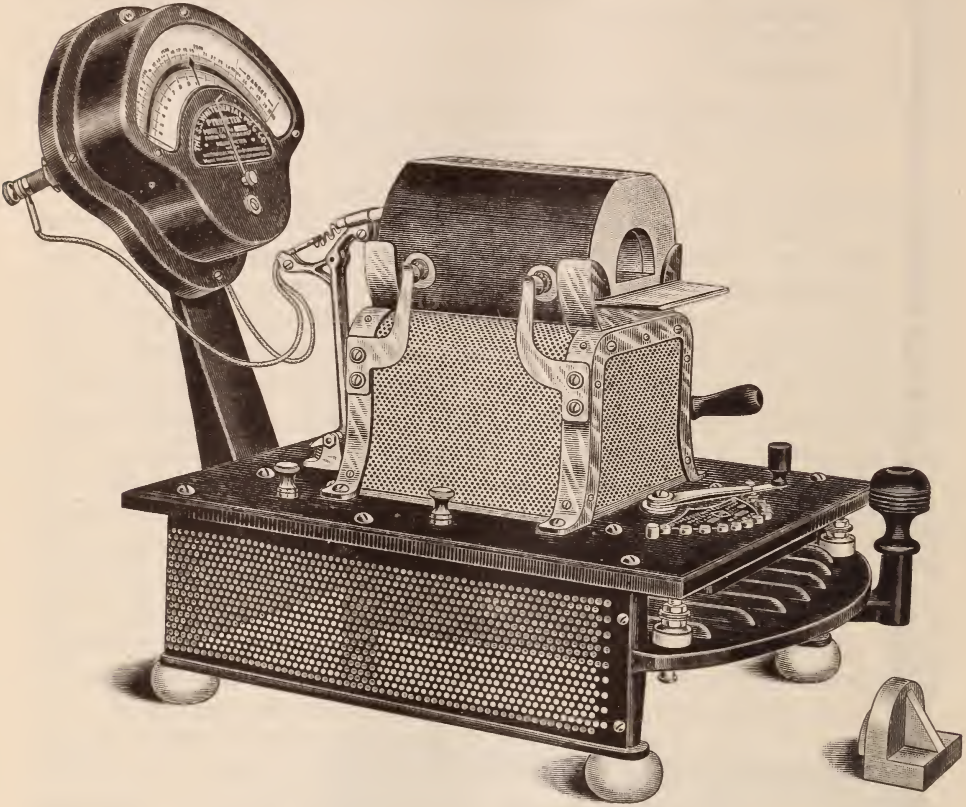

DANGER
THE S.S. WHITE DENTAL MFG. CO.
PYROMETER

Fig. 231—Electric furnace with pyrometer attachment.

EDITORIAL

OHIO STATE DENTAL SOCIETY

The fifty-fifth annual session of the Ohio State Dental Society was one of unusual interest and the largest attended of any meeting yet held, there being about eleven hundred members present.

Tuesday afternoon and evening, and Wednesday afternoon and evening were devoted to the literary part of the program. Lecturers and essayists comprised such dentists as: C. W. Mills, Chillicothe; D. D. Campbell, Kansas City; L. E. Custer, Dayton; H. E. Friesell, Pittsburgh; A. A. Nelson, Detroit; E. I. McKesson, M.D., Toledo; E. L. Pettibone, Cleveland; E. S. Braithwaite, Willard; C. C. Sherwood, Toledo; F. C. Starr, Columbus; C. H. Schott, Cincinnati; D. P. Snyder, Columbus; H. V. Cottrell, Columbus; Henry Barnes, Cleveland; I. Lester Furnas, Cleveland; Fred Miller, Altoona, Pa.; Rose Coxon, Utica, N. Y.; H. C. Brown, Columbus. T. B. Hartzell, of Minneapolis, and Otto U. King, Chicago, also addressed the assemblage.

Wednesday forenoon was given over to the Dental Manufacturers and Dealers for clinical demonstrations.

Thursday morning and afternoon general clinics were given. Among out-of-state men who cliniced were: Campbell, Kansas City; Nelson, Detroit; Heermans, Chicago and McCall, Buffalo.

It was a great meeting. Something of interest every minute. Those who failed to attend never will know how much they missed nor how much their patients have lost.

The Board of Directors adopted the report of the Callahan Memorial committee as given by T. I. Way, chairman.

Resolutions were adopted on the death of W. G. Ebersole, J. A. Evans, D. H. Morgan and Hamlin Barnes. (If other deaths occurred they were unreported).

A letter from Dr. A. W. Freeman, Commissioner of Health, asked for the appointment of a committee of three from the society to act in an advisory capacity to the Department of Health. The committee appointed consists of Drs. H. C. Brown, F. R. Chapman and E. S. Braithwaite.

Dr. Freeman is considering a plan to establish a Bureau of Oral Hygiene within the Department of Health, with a dentist on full time at the head.

Drs. H. E. Friesell, Pittsburgh, T. B. Hartzell, Minneapolis and Otto U. King, Chicago, were elected to honorary membership in the society, also Dr. Frank W. Sage, Cincinnati, retired.

The invitation of the Cleveland Society to the National Dental Association to meet in Cleveland in 1923, was endorsed and the influence and support of the Ohio State Dental Society promised.

Officers elected for the ensuing year are: President, H. M. Semans; president-elect, C. H. Schott; vice-president, E. L. Pettibone; secretary, F. R. Chapman; treasurer, A. O. Ross, member of board of directors for three years, H. C. Brown; delegates to the National Dental Association, for two years, H. C. Brown, J. F. Stephan, E. C. Mills, F. M. Casto; alternates, W. H. Hayden, G. D. Edgar, Z. W. Wright, E. S. Braithwaite.

The next meeting will be held in Columbus, December 6, 7, 8, 1921.

COMPLIMENTARY DINNER TO DR. LEVITT E. CUSTER

On the evening of November 27th, the Miami Valley Dental Society, Dayton, Ohio, gave a dinner in honor of one of its members, Dr. Levitt E. Custer. About one hundred guests were present, and an evening of real enjoyment ensued. Dr. Church, of Dayton, acted as toastmaster, and responses were made by many of those present. Congratulatory telegrams and letters from all sections of the United States, and some foreign countries were read and enjoyed. Dr. Custer has for years been one of the leading dentists in the profession, and is favorably known throughout the dental world. He has made many valuable contributions to dental science and has given the profession many inventions of merit, but has never patented any of them with the intention of securing a royalty or other stipulation from dentists. Everything he has originated of service to brother practitioners he has given without compensation for the good of dentistry. Ever ready to respond when duty calls; such is the man the society honored; such are the men we point to with pride.

THE JOHN R. CALLAHAN MEMORIAL

In this issue of The Summary we publish the report of the Callahan Memorial Committee as adopted by the Ohio State Dental Society at its recent meeting.

The fund being raised will be used for a one and two-thirds life-size bronze bust of the late Dr. J. R. Callahan, Cincinnati, and for maintaining permanently encouragement and assistance in dental research. The funds shall be administered by a commission to be known as the Callahan Memorial Award Commission which shall comprise four members from the Ohio State Dental Society and three members from the membership of the National Dental Association and not members of the Ohio State Dental Society. The commission shall each year make a suitable award in the form of a medal to a person who in its judgment has made to dental science the contribution which is of exceptional value. The person selected shall be invited to attend the meeting of the Ohio State Dental Society, to receive the award and to give to that body an oration or scientific paper on a subject in which he has distinguished himself. Not more than two medals may be given in any one year. Expenditure of the balance of the annual income shall be made by the commission in such manner as shall in their judgment best further dental science.

Thus the awards are not confined to dentists. Anyone, whether a member of other professions or a layman, is eligible, if he has made to dental science a contribution of exceptional value.

The aim of the committee has been to raise a fund of ten thousand dollars. We hope that the good cause will stimulate the giving of a much larger sum to this commission. When the subscription is complete we will publish a list of donations and personal gifts from the various State, District and Local Societies. To date about eight thousand dollars have been subscribed.

The bronze bust of Dr. Callahan being made by Mr. Frederick C. Hibbard, of Chicago, who made the W. D. Miller and G. V. Black memorials, is progressing, and will be ready for unveiling when the society so orders.

ERRATUM

In December SUMMARY, in Dr. Hart's article, the quotation marked on page 1024, should be continued to the completion of the third paragraph on page 1025. Also *Fig. 11* was inadvertently printed wrong side up. If our readers will please mark these corrections in the pages of their SUMMARY, the matter will stand as intended by the author.—*Ed.*

The X-Ray Not Infallible

It is not too much to say that the X-ray has not proved an unmixed blessing to the profession. Certainly, there are many cases in which its aid has been invaluable, but, on the other hand, many conditions which do not exist are "discovered" by persons who cannot properly interpret the pictures, and further, the pictures themselves are frequently defective and convey a wrong impression even to experts. As a result, teeth are extracted without any justification whatever.

—*Editorial Commonwealth Dental Review.*

OHIO STATE SOCIETY

UNVEILING OF MONUMENT AND MEMORIAL TABLET

TO

FREDERICK HENRY REHWINKEL, M.D., D.D.S.,

AT CHILLICOTHE, OHIO

On NOVEMBER 29, 1920, an occasion of unusual interest to the dental profession took place at Grandview Cemetery, Chillicothe, Ohio, in the unveiling of a memorial tablet to Dr. F. H. Rehwinkel, as a preliminary event to the opening of the fifty-fifth annual session of the Ohio State Dental Society, at Columbus.

Pursuant to the arrangement, as announced in the program for the State Society meeting, a number of dentists met at the Masonic Temple, and at 2:00 P.M., accompanied by about fifty members of the Chillicothe Commandery No. 8, Knights Templar, under a special dispensation to participate in the occasion, proceeded to the grave of Dr. Rehwinkel, where, after properly assembling, the following exercises took place:

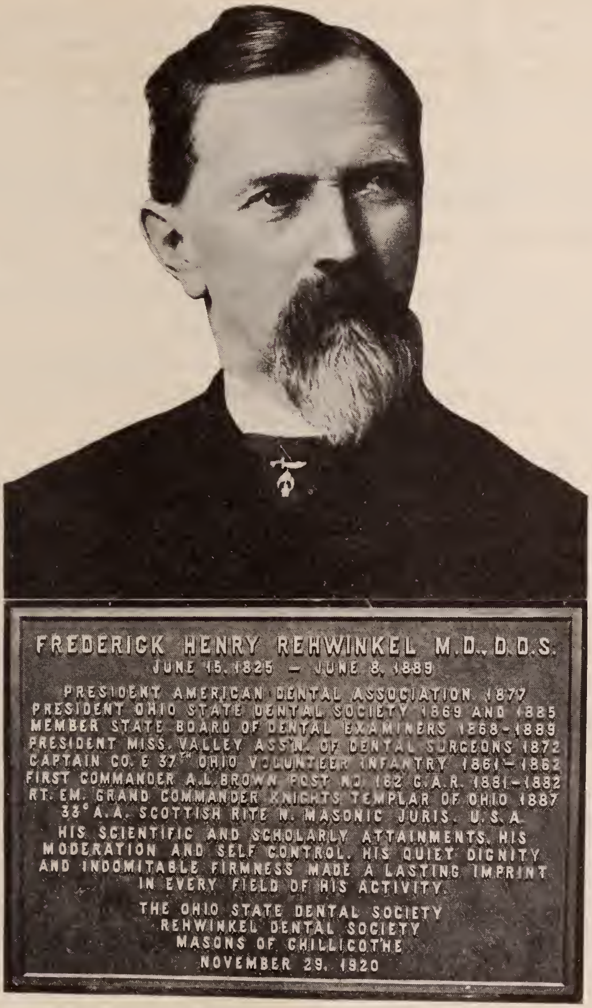
Dr. Charles W. Mills, of Chillicothe, president of the Ohio State Dental Society, spoke as follows:

"Members of the dental profession and fraters of Chillicothe commandery: We have assembled on this occasion to do honor to the memory of one who in life enjoyed a national reputation in our profession for his literary contributions and zealous activities in advancing the standards of dentistry. His private life was an exemplification of the principles of Templar Knighthood, and, for his zealousness in this Order, he received a deserved recognition by being chosen Right Eminent Grand Commander Knights Templar of Ohio, and in Scottish Rite Masonry was advanced to the 33rd and last degree.

"As dentistry and freemasonry were the subjects in which he was best known to his generation, it was deemed most fitting for this occasion to have an address each on his activities as a Mason and those as a dentist."

Assisted by Dr. L. E. Custer, of Dayton, Ohio, Master Charles William Mills, son of the chairman of the meeting, unveiled the monument and tablet, the inscription on which is reproduced:

Dr. Mills then introduced Mr. John P. McCune, of Columbus, Ohio, 33° Active and Past Grand Commander Knights Templar of Ohio, who spoke of "Rehwinkel and Masonry" in which he paid a beautiful



FREDERICK HENRY REHWINKEL M.D., D.D.S.
JUNE 15, 1825 — JUNE 8, 1889
PRESIDENT AMERICAN DENTAL ASSOCIATION 1877
PRESIDENT OHIO STATE DENTAL SOCIETY 1869 AND 1885
MEMBER STATE BOARD OF DENTAL EXAMINERS 1868-1889
PRESIDENT MISS. VALLEY ASS'N. OF DENTAL SURGEONS 1872
CAPTAIN CO. E 37TH OHIO VOLUNTEER INFANTRY 1861-1862
FIRST COMMANDER A. L. BROWN POST NO. 162 G.A.R. 1881-1882
RT. EM. GRAND COMMANDER KNIGHTS TEMPLAR OF OHIO 1887
33° A. A. SCOTTISH RITE N. MASONIC JURIS. U.S.A.
HIS SCIENTIFIC AND SCHOLARLY ATTAINMENTS, HIS
MODERATION AND SELF CONTROL, HIS QUIET DIGNITY
AND INDOMITABLE FIRMNESS MADE A LASTING IMPRINT
IN EVERY FIELD OF HIS ACTIVITY.

THE OHIO STATE DENTAL SOCIETY
REHWINKEL DENTAL SOCIETY
MASONS OF CHILLICOTHE
NOVEMBER 29, 1920

tribute to the character of Dr. Rehwinkel, his activities in masonry and his zeal for the institution, which included his Masonic record in part as follows:

Aurora Lodge No. 48 F and A. M., Portsmouth, Ohio—Raised, October 11, 1852. Affiliated—Scioto Lodge No. 6, Chillicothe, Ohio, March 3, 1853.

Chillicothe Chapter No. 4, R. A. M.—Royal Arch, September 18, 1861. Elected High Priest, January 8, 1884; served until December 5, 1885. Received Order of High Priesthood, September 16, 1884 at Tiffin, Ohio.

Chillicothe Council No. 4, R. and S. M.—Royal and Select Master, September 20, 1866.

Chillicothe Commandery No. 8 Knights Templar—Knights Templar and Malta, October 1, 1866. Elected Eminent Commander, November 28, 1878; served until

November 25, 1880. Elected Rt. Eminent Gr. Commander K. T. of Ohio, October 12, 1887, at Columbus, Ohio.

Ancient and Accepted Scottish Rite—32° Ohio Consistory, Cincinnati, Ohio, January 18, 1882. 33° September 15, 1885, Nor. Masonic Juris; at Boston, Mass.

Mystic Shrine—Initiated, March 7, 1884, Syrian Temple, Cincinnati, Ohio.

Dr. Edward C. Mills, of Columbus, was then introduced, and spoke as follows:

"Members of the Profession and Fraters of Chillicothe Commandery: In accepting the invitation to address you on 'Rehwinkel and Dentistry,' it was done with much timidity on my part, because I felt the inadequacy of words to express fully the reverence in which I always have held the name of Dr. Rehwinkel, and the inspiration his preceptorship was to me when I entered the dental profession.

"As my address refers somewhat to his professional activities, I would ask those of the laity present, to bear patiently with me through that feature of it."

Dr. Mills then read the following address:

> Instances are indeed rare in the history of a human life where such honor and recognition are given to an individual, almost a third of a century after he has crossed the Great Divide, as we are now paying to the memory of Frederick Henry Rehwinkel.
>
> It is evident that the flight of years has not dimmed the luster of his achievements in those fields that were benefited by his activities. Our gratitude to him finds us on this occasion responding to that noble impulse, which, since time immemorial, has swayed the human mind to commemorate certain important events, or to do honor to the memory of some individual who has acquired certain fame in some line of activity.
>
> Science and literature have added more imperishable names to the world's annals than any other endeavor, because these specialties contribute largely to human development, comfort and happiness, and those essentials upon which our progress and expansion depend.
>
> The names that stand preeminent in dentistry were in the main—not those whose whole energy was concentrated in their chosen specialty—but those who have been men of recreative diversion, and by indulging the various bents of their minds, have, through contact and association, rounded out to fuller possibilities, and are accepted as better-balanced and more widely-informed men.
>
> Few men have been so signally honored, both in the profession and out of it—none more modest in receiving recognition than Dr. Rehwinkel, and the tablet we have today dedicated to him shall mutely testify to coming generations, that the name it bears was revered by his confreres, and the recognition inscribed thereon should be an inspiration to them for more than ordinary attainment.
>
> Association with him as a student soon caused in me a profound reverence for him as a man of high ideals, with a mind versed in infinite subjects which afforded him valuable relaxation from the stress of a busy practice. For example: Entomology was one of his many diversions, and in the early spring he eagerly welcomed the strange and varied forms of insect life, which he studied with the enthusiasm of a scientist. His interest in scientific subjects was not his only means of diversion from the necessary cares of life. He was a great lover of nature, and appreciated her handiwork which was so fully lavished on the environs of the city of his adoption—for Chillicothe is so situated in the

valley, with the beautiful hills surrounding it and the streams enriching her fertile plains, that one who had chosen the spot in which to live felt fortunate indeed; while those of us who claim it as the home of our nativity, are well-rooted to the place and feel a tender kinship for it—for the sounds and accents which haunt it; and the definiteness of early memories are inwrought with affection and kindly acquaintance, so that one ever returns to partake of the restful spirit which pervades the place. He loved the call of the wild, and field sports were one of his many hobbies. His bird-dog "Queen" received the same loving care as a member of his household, and her almost human intelligence seemed to bespeak a loyalty to her fond but dignified master in the pursuit of the one out-of-door sport, which was perhaps to him the most alluring.

As an estimate of his attainments by one of his confreres in the dental profession—in the discussion of a paper read before the New York Odontological Society, April 17, 1877, on Devitalized Teeth and their Management—Dr. W. H. Atkinson, of New York, in his time dean of the dental profession, paid him the following tribute in opening the discussion:

> "This is one of the very few papers that come before us entitled to, or able to bear, severe criticism. The gentleman being well learned, is much more likely to lead us astray when he is in error, because of his clearness of statement where his statements are true, for the reason that our confidence is gained by the clear coincidence of our own judgment with the main statements in the paper; therefore we had better be a little cautious about accepting the whole." (*Cosmos*, Vol. XIX, p. 455, N. Y. O. S. for 1877).

In this paper he advocated the same conditions we are striving for today—those that will make necrotic tissue compatible with the living.

Touching on his technic in root-canal work, I recently have received a letter from Dr. Howard Raper, a native of Chillicothe, now of Indianapolis, Ind., in which he mentions several teeth, the roots of which had been successfully filled by Dr. Rehwinkel, as shown by an X-ray examination.

At a meeting of the American Dental Association in Chicago, 1877, as a report of the committee on pathology and surgery, he read a paper entitled "Causes and conditions attending the formidable disease of the gums and root membranes and alveolar process known as Pyorrhea Alveolaris." In this paper he endeavors to establish "that pyorrhea may and does exist independently of foreign deposits, and that it does occur in the cleanest of mouths and must, for its origin, depend upon other than mere local causes." (Trans. American Dental Association, 1877: *Dental Cosmos*, 1877, p. 572).

In Black's Special Dental Pathology, 1815, reference is given to the above paper, as follows:

> "Dr. Rehwinkel's paper in 1877, was by far the best writing upon this subject up to that time. It abounds in inquiry, rather than in the discovery or announcement of the principles of pathology. It is rich in reference of both American and European authors. Although it set a landmark in the name to which it gave origin, it did little to advance our knowledge of the disease. No hint is given of the pus pocket as such, or as a distinct entity in the pathology of the peridental membrane; the nearest approach to this idea is the mention of the peculiar form of calculus which occurs on the sides of roots where the membrane has been destroyed, and states it is sometimes different from salivary calculus; states many suppositions regarding systemic conditions as causative factors in inducing disease of this tissue."

In the *Dental Cosmos* for 1875, page 278, under "Hints and Queries," a condition of the gums is described, and a reply signed "J. T." stated that the disease as described indicated it to be "Pyorrhea Alveolaris" of the French writers. Without inquiry as to the origin of the term now so familiar to the laity, full credit must be given to Dr. Rehwinkel for introducing the term into American dental literature and having called the attention of the dental profession to its seriousness.

Time did not permit the compilation of a complete list of his contributions to literature, but his writings were lucid and instructive and of great benefit to the profession.

A skillful operator, careful student, a strong advocate of efficiency in all branches of practice, Dr. Rehwinkel was classed with and enjoyed the sincere friendship of such stars in the dental firmament as Atkinson, Taft, Watt, Butler, Keely, Webb, McKellops, Palmer, Black, and scores of other contemporaries.

A man of high ideals, he was ever alert to raise the standard of his chosen profession. He was active in securing the passage of the first dental law in Ohio in 1868, defended it when assailed, and served continuously on the State Board of Examiners which this law called into existence, from 1868 until his death, when he was succeeded by Dr. L. E. Custer, of Dayton, Ohio.

Graduating from the Baltimore College of Dental Surgery in March, 1855, he prepared a graduating thesis on "Causes of Dental Caries." In this class of twenty-seven graduates are found the names of F. J. S. Gorgas, H. McG. Grant, and others whose names became well known throughout the dental world.

His activities in the Ohio State Dental Society were as varied as the offices and committees would permit:

Charter member, 1866; second vice-president, 1868; president, 1868 and 1885; (being the only person twice honored with this office); member board of examiners, 1868 to 1889 inclusive; board of directors, 1888 and 1889; committee on membership, 1866, 67, 68, 87, 88; committee on ethics, 1868, 69, 72; executive committee, 1874, 75, 76, 78, 79, 82, 84; committee on dental law, 1881, 85, 87, 88; committee on patents, 1871; committee on constitution, 1885; clinic, 1886, on "Herbst Method of Filling."

He served as president of the old Mississippi Valley Association of Dental Surgeons, in 1872. In National dental affairs, he was no less active. Elected president of the National Dental Association. in 1877. Secretary of the Section of Dental and Oral Surgery at the International Medical Congress, in Washington, D. C., in 1887, and president of Dental and Oral Section, American Medical Association, and would have presided at Newport, R. I., June 25-27, 1889, had he lived.

In recognition of his dental activities, one of the most active of our Component Societies was christened in his honor, as the Rehwinkel Society, at its organization, September 18, 1910.

He recognized early in his dental career, the important and sustaining influence of association with members of his profession, for in them he found a community of interests which he could not resist. His membership in the various dental associations brought him in contact with men who were an inspiration to him, and he gave his hearty support to everything pertaining to the welfare of his profession. Of his contemporaries or predecessors in Chillicothe, none, to my knowledge, were members of dental societies, or if so, failed to get the stimulation that would give them anything more than a local prominence. The record of the results of Dr. Rehwinkel's activities are a strong contrast to those of the dentist, who, ostracizing himself from his professional associates, sinks into the proverbial rut which leads to antemortem oblivion.

Next to his profession, Free Masonry was closest to his heart, and in this he advanced to the highest grade—the only member of our profession having been honored by the office of Right Eminent Grand Commander Knights Templar of Ohio, and the first of three who had attained the 33° Ancient and Accepted Scottish Rite. The other two, also deceased, were Drs. Jos. A. Stipp, Toledo, and Chas. R. Butler, Cleveland.

In the civic affairs of Chillicothe he was well informed, but owing to his inclinations his activities were naturally along educational lines. He was for several years a member of the Board of Education, serving as president of that body in the early eighties. Throughout his professional career he maintained that a high school diploma should be the credential for admission of students to dental colleges, and it is of interest to note that the dental law in Ohio, making this obligatory, became operative thirty years after his death. It may truly be said of him that some of his professional ideals were in advance of his time.

In enumerating the activities of Dr. Rehwinkel it may not be amiss to include some biographical notes that have been obtained from various sources:

From the church register of Neuenhausen, Celle, Hanover, Germany, is found that Frederick Henrich Rehwinkel was born June 15, 1825 and was christened July 17, 1825, in the house of his father Yohann Heinrich Rehwinkel, living in the part of Celle now known as Altenhausen. The family of Rehwinkel still living in Celle, has no record or traditional memory of the man whom we honor today.

When about twenty-three years of age he graduated from a Homeopathic Medical College in his native country, and because of the political troubles in Germany he emigrated to America in 1848. One of the number of young men who came to this country at this time and who was frequently mentioned by Dr. Rehwinkel, was Carl Shurtz, who became a prominent number of our National Congress. A younger brother to whom the Doctor was greatly attached—having been stricken with tuberculosis and to whom a sea voyage had been recommended—came with him. Arriving at Baltimore, they were advised to go further south and went to Mississippi, where the invalid brother died a few months later.

Dr. Rehwinkel began the practice of medicine in Natchez, Miss., afterwards came to Cincinnati, Ohio, where he associated himself with one Dr. Ehrman and they did much work during the epidemic of cholera there in 1849. Being advised of a promising opening in Chillicothe, Ohio, he located there in 1850, but not meeting with the success he anticipated he moved to Portsmouth, Ohio, in 1851, where he associated with Dr. Zimri Hussey. In November, 1851, he married Mary K. Jones, of Chillicothe (who was born in 1839 and died in 1912). To this union one daughter, Cora, was born, who still survives.

In December, 1852, he returned to Chillicothe, and in 1853, finding his tastes and inclinations more in harmony with the practice of dentistry he began the study with Dr. Joseph Sanford, a pioneer dentist there who died in 1864.

In 1854, he entered the Baltimore College of Dental Surgery. He often referred to the cordial greeting given him by Chapin A. Harris, Dean and Founder of the school, when the latter learned that he came from Chillicothe, only twenty miles from Bainbridge, where Harris' brother John had practiced medicine and he himself, with James Taylor, Founder of the Ohio College of Dental Surgery, had both received their first instruction in dentistry. After graduation he returned to Chillicothe where he soon built up a choice clientele and practiced continuously until his death, June 8, 1889.

Though of foreign birth his patriotism for the country of his adoption must not be omitted. The 37th Ohio Volunteer Infantry was the third German Regiment raised in Ohio and was recruited principally among the patriotic

Germans of Cleveland, Toledo and Chillicothe. Its organization commenced under the second call of Lincoln for 300,000 men, in August, 1861; by October 1, seven full companies had reported and Colonel E. Siber, an accomplished German officer who had seen active service in Prussia, was selected commanding officer. Dr. Rehwinkel having assisted in organizing Company E, of the 37th, was elected Captain. After a short term of service, principally in the Kanawha Valley, W. Va., he was ordered home on sick leave, and when returning to his regiment was so injured by the overturning of a stage coach near Gallipolis, that he was obliged to use crutches for a year and had to retire from military service October 1, 1862.

During the excitement in Southern Ohio, due to the raid of the guerilla chief, John Morgan, in 1863, he was Colonel of a regiment of raw militia encamped on the land now bounded by Paint, Fifth, Caldwell and Seventh streets in Chillicothe. Some of his own troops burned the bridge over Paint Creek, then but about seven inches of water, and started the cry, "Morgan is coming." He failed to come, however, and a few days later Dr. Rehwinkel marched his regiment from Athens, Ohio, to Chauncey on the road to Ironton, and back, a distance of more than thirty-five miles in one day. The weather was hot and the troops that succeeded in reaching Athens that night realized that they had covered some territory.

His relation to the Grand Army organization was to him a source of pleasure and pride, and from them the following record has been kindly furnished by A. L. Brown Post No. 162:

Enlisted September 1, 1861; resigned October 1, 1862; Captain Company E, 37th O. V. I., 1861-1862; mustered into G. A. R. December 2, 1881; first Commander of the Post 1881-1882.

His religious affiliations were with St. Paul's Episcopal church.

In small towns there prevails a spirit of comradeship which is not possible in the city. Perhaps by closer association men learn to know one another more intimately, and here and there we find groups of friends of more or less prominence in the life of the place.

Here in Chillicothe at the time Dr. Rehwinkel was advancing in years but still active in his profession, was a coterie of men who were held in high regard by the younger generation. They represented the various professions, the mercantile pursuits, and others of some literary attainment and minds broadened by extensive travel. In fact, few other towns could boast of the type of men of such distinguished demeanor as were residing in Chillicothe at the time referred to. It was the custom of these gentlemen to stop occasionally at one of the stores opposite the old post office on Second street, for discussion of current topics. There was no prearrangement in this, simply "drop-in", purely incidental meetings, but perhaps the more enjoyable by reason of this. It was not town gossip that brought them together, nor a matter of simply idling away the time; it meant a very real companionship—an honest exchange of ideas and views on the issues of the day. Among these men were counted many who meant much to the real life of the town and who were not only prominent in the home circles, but who had made names for themselves in the wider fields of activity, and among them was the man whom we honor today, whose interest in all matters of this kind was keen and intelligent.

Dr. Rehwinkel was a big man among men—a personality which dominated, an intellect which attracted and commanded. He had a keen sense of right and wrong, appreciating always the motive prompting an action. He was generous, friendly, sympathetic, kind-hearted and ever ready to help any who were in trouble. He had a sincere faith in things spiritual, believing that the life beyond held the fulfillment of all earthly promise, the completion of work begun.

My personal estimate of the man whom we honor today, is, that his eminence as a dentist, his usefulness as a citizen, his character as a man, secured for him an enviable reputation; while the frankness, generosity and nobleness of his heart, won the lasting love of all who knew him.

"Like flower-bloom and fragrant breath,
His life survives the touch of death.
So we turn from his grave with eyes undim
To greet the newborn day—and him."

Dr. A. F. Emminger, formerly of Columbus, but now retired and living in Los Angeles, California, spoke as follows:

Sir Knights, friends, brothers:

It is not with a feeling of pleasure that I respond to this call to make a few remarks upon this memorable occasion in honoring the memory of our departed brother and friend, but with a deep sense of feeling and sorrow. I deem it a great privilege.

It was my good fortune to know the deceased intimately, perhaps more intimately than any man in the profession of dentistry. From the first day of our meeting there seemed to spring up simultaneously a feeling of frienshdip and love. I was attracted to him, and he seemingly to me. Our likes and dislikes seemed to run in parallel channels.

He loved nature, and wanted to and did live close to it. He was passionately fond of field sports, the rod, dog and gun.

It was our custom each year to spend the hunting season in the field with dog and gun. He maintained a kennel in Chillicothe, (bird dogs and beagle hounds) and I one in Columbus. On Friday night it was my custom to run down to Chillicothe. Saturday was spent roaming over the hills and through the valleys about his home town. Sunday was spent in social intercourse. Frequently, if Sunday was bright and the sun shining we would take a walk and frequently find ourselves on Grandview Cemetery Hill, on this bluff where his body now lies cold in death, overlooking Paint Creek Valley, when he would exclaim,"Em (as he called me) have you ever seen anything more beautiful?" The following Friday night he would run up to Columbus. On Saturday we would repeat, keeping this up throughout the hunting season.

Brother Rehwinkel was a big man among his fellow men, a man of high ideals, a man of scholarly attainments, had a high conception of right and wrong, and wanted to be considered a right-minded man, always looking upon the bright side of life, had a keen sense of honor, could tell a good story, and enjoy a good story; knew "where the laugh came in," and always doing his part in the domain of amusement and entertainment. He was a formidable adversary in debate, quick at repartee, caustic when occasion required. He despised hypocrisy and deceit, if he was your friend you knew it, or against you, you knew it; no middle ground.

In public life he would have been a leader, and would have gone to the top as was evidenced in his Masonic career.

All in all, Brother Rehwinkel was a big brainy man of fine high attainments and tender-hearted as a child, was attracted and attached to the younger men in the profession, always ready and willing to extend the helping hand and encouragement.

Well do I recall when in New York City attending the National Meeting, in 1881, Dr. Rehwinkel, Dr. George W. Keely and myself were walking down one of the principal thoroughfares and I had asked, "how they happened to

> cast their lots in small places or towns?" when a funeral procession went trotting by. Dr. Rehwinkel took me by the arm and said, "Look at that; do you know who it is? That is why, I am too old to change; and I have the consolation of thinking that when my time comes everybody in Chillicothe will know who it is, and as the funeral procession passes down the street, they will stand on the sidewalk and say, 'there goes poor old Rehwinkel.'" I looked at him and there were tears in his eyes and in mine too.
>
> In my early professional career he was my ideal and model and I felt I was a better man for my acquaintance and associations with him. Peace be to his ashes.

Mr. Richard Enderlin, of Chillicothe, representing the Grand Army, spoke of Dr. Rehwinkel's activities in the Civil War, eulogized his patriotism, and made a masterful plea for loyalty to our flag and our country.

REPORT OF THE CALLAHAN MEMORIAL COMMITTEE*

To the Board of Directors of the Ohio State Dental Society:

(*a*) The committee on the Callahan Memorial begs leave to make the following report and recommendations:

ORGANIZATION

Funds are being raised to provide for the erection of a bronze memorial to Dr. John R. Callahan in the general hospital grounds in Cincinnati, Ohio, and for maintaining permanently, encouragement and assistance in dental research. The funds shall be administered by a commission to be organized as follows:

NAME

There shall be created a commission which shall be known as The Callahan Memorial Award Commission.

(*b*) This commission shall consist of seven members elected by the Board of Directors of the Ohio State Dental Society, four of which shall be elected from the membership of the Ohio State Society to serve for a period of four years, except that of the first commission. One shall serve for four years, one for three years, one for two years and one for one year, and three of which shall be elected from the membership of the National Dental Association, and not members of the Ohio State Society, to serve for a period of three years, except that of the first; one that shall serve for three, one for two and one for one year.

(*c*) The moneys of this fund shall be placed in the hands of the commission for care and investment at the time of the unveiling of the memorial.

(*d*) The commission shall each year make a suitable award in the form of a medal to a person who in its judgment has made the contribution to dental science which is of very exceptional value. The person selected shall be invited to attend the meeting of the Ohio State

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*Adopted at the meeting of the Ohio State Dental Society, December 2, 1920.

Dental Society, to receive the award and to give to that body an oration or scientific paper on a subject in which he or she has distinguished himself or herself. Not more than two medals may be given in any one year, and then preferably to be limited to cases of joint publication. Since the paper given by the person receiving the award shall be for the direct advantage and help of the members of the Ohio State Dental Society, it shall be understood that the expense of bringing the essayist shall be carried by the Ohio State Society as for the remainder of its program.

(*e*) The expenditure of the balance of the annual award, viz., the balance of the annual income, shall be made by the commission in such manner as shall in their judgment best further dental science. The commission shall make an annual report to the Board of Directors of the Ohio State Dental Society.

(*f*) The commission shall have charge of the Callahan Exhibit of anatomical specimens now at the Research Institute of the National Dental Association in Cleveland, Ohio.

(*g*) The committee on organization further recommends that the personnel of the first commission shall be as follows: Ohio members, Dr. C. Stanley Smith, Cincinnati, for one; Dr. Weston A. Price, Cleveland, for two; Dr. H. M. Semans, of Columbus, three; Dr. L. L. Barber, of Toledo, four years. National Dental Association members: Dr. Russell A. Bunting, Ann Arbor, Michigan, one; Dr. Clarence J. Greives, Baltimore, Maryland, two; Dr. Arthur H. Merritt, of New York, three years.

(*h*) There shall be two executive officers, a chairman and a secretary and treasurer, who shall be elected annually by the commission from its Ohio membership.

(*i*) The commission shall hold an annual meeting at the time and place of the annual meeting of the Ohio State Dental Society.

(*j*) The commission shall make such rules and regulations for the carrying out of its work as it shall deem wise.

December 2, 1920.

T. I. WAY, *Chairman,*
Callahan Memorial Commission.

DETAIL-MEN BANQUET AND HONOR DR. HARRY COPE

On the evening of November 30, 1920, during the Convention of the Ohio State Dental Society held at Columbus, Ohio, about sixty members of the National Association of Detail-Men gathered at a dinner held at Memorial Hall, president M. H. Pritchard presiding.

The National Association of Detail-Men is an organization composed of some four hundred members who call upon dentists and physicians in all sections of the country, as well as covering the various national and state conventions of these bodies.

There were interesting speeches made by president Pritchard, secretary E. De L. Eaton, Dr. A. M. Scott, dean of the detail profession, and others. After the dinner Mr. Edward Sprague rendered several vocal selections, accompanied by Miss Edna Volrath. Dr. Harry Cope, of Columbus, was the guest of honor at this dinner and great praise was bestowed upon him for the able manner in which he handled the many problems for members exhibiting at the Columbus meeting. Space was carefully reserved and excellently arranged; transportation was well taken care of and an interior decorator was provided who did not overcharge. In appreciation of this able management on the part of Dr. Cope, the members of the N. A. D. M. generously subscribed to a gift for him. It was very apparent that Dr. Cope did not expect anything of this sort, as he was taken completely off his feet and unable to make one of his usual interesting speeches.

During this Columbus meeting, it was recalled that the Ohio State Dental Society was the first dental society in the country to have exhibited at their annual conventions dental products and appliances. The older members of this society could not help but compare the first exhibit held with the present one, where over one hundred firms gathered and the wants of the dental profession were represented. The National Association of Detail-Men is in a large way responsible for the high type of the present exhibits at the various dental conventions.

AN enterprise, when fairly once begun, should not be left till all that ought is won.—*Shakespeare.*

SOCIETY·ANNOUNCEMENTS

Iowa State Board

The Iowa State Board of Dental Examiners will meet for the purpose of examining candidates for license to practice in Iowa, at Iowa City, College of Dentistry, beginning Monday, February 7, 1921, at 9:00 A.M.

For further information and application blanks, address

DR. C. B. MILLER, *Secretary,*
726 Fleming Bldg., Des Moines, Iowa.

The St. Louis Study Club

The St. Louis Study Club announces its third annual midwinter clinic, to be held in St. Louis at the American Hotel Annex, on January 15, 1921, from 2:00 to 5:00 P.M. At this clinic will be shown the results of the work accomplished during the session just closing. Following the clinic and at 6:30, a dinner will be given in honor of the instructors.

All ethical dentists are invited to attend.

J. F. ALCORN, *Secretary.*
319 Metropolitan Bldg.

National Association of Detail Men

The National Association of Detail Men will be pleased to learn of any local or state dental meetings at which exhibits are a feature, so that they can be published in our bulletin in order to enable all our members to arrange and attend these meetings. Please address

E. DE L. EATON, *Secretary,*
6208 Wayne Ave., Chicago, Illinois.

Texas State Dental Society

The Texas State Dental Society will hold its forty-first annual convention on Thursday, Friday and Saturday, the 3rd, 4th and 5th, of March, 1921, at Dallas, Texas.

The executive committee is endeavoring to make this meeting an unusually attractive one, and to that end will not only utilize the best talent of the society, but will bring a in few outside men of note.

Clinics will be made a prominent feature.

On Monday following, will commence the society's second annual post-graduate class course, to continue one week, and which will be conducted by the following instructors: Drs. Rupert E. Hall, Chicago; F. Ewing Roach, Chicago; T. W. Maves, Minneapolis; Arthur E. Smith, Chicago; Thos. B. Hartzell, Minneapolis; Clarence O. Simpson, St. Louis.

J. G. FIFE, *Secretary*, Dallas, Texas.

Michigan State Dental Society

The next annual meeting of the Michigan State Dental Society will be held at the Hotel Statler, Detroit, April 11 to 16, 1921.

William H. Elliott, 7643 East Jefferson Ave., Detroit, Michigan, chairman of the program committee; W. H. Waller, 613 Washington Arcade, Detroit, Michigan, in charge of exhibits; W. A. Cook, 422 McKerchey Bldg., Detroit, Michigan, in charge of hotel reservations.

CLAUDE S. LARNED, *Secretary,*
614 Post Bldg., Battle Creek, Michigan.

Minnesota State Dental Association

The annual meeting of the Minnesota State Dental Association will be held at the Auditorium, St. Paul, Minnesota, on February 9, 10, 11 and 12, 1921.

A cordial invitation is extended to all members of recognized dental societies.

C. H. TURNQUIST, *Secretary,*
338 La Salle Bldg., Minneapolis, Minn.

American Institute of Dental Teachers

The next annual meeting of the American Institute of Dental Teachers will be held at the Claypool hotel, Indianapolis, Ind., January 24, 25 and 26, 1921.

The program will contain much of interest in dental teaching methods and dental educational affairs. A cordial invitation is extended to all ethical practitioners and others interested along these lines to attend the sessions.

DR. ARTHUR D. BLACK, *President.*
DR. ABRAM HOFFMAN, *Secretary.*
381 Linwood avenue, Buffalo, N. Y.

One Definition

"Pa," asked Willie, looking up from his book, "what is a speculator?"

"A speculator, son," answered the man who had played the market not wisely but too freely, "is a man who plays a game which consists of going up to a frosted window with a wad of money and poking it through to a waiting clerk.

"After a while another clerk puts his head through another window and says, More margin! And there the game ends."

OBITUARY

Theodore Garwood Lewis, D.D.S.

THEODORE GARWOOD LEWIS, D.D.S.

Born, Burlington, Vt., December 14, 1836. Died, Buffalo, N.Y., November 28, 1920. Son of Dr. John Lewis, and Mary Josselyn Lewis.

His father, John Lewis, was a practicing dentist in Burlington, and continued this practice after he moved to Buffalo, about 1844. Theodore G. had dim recollections of the trip to Buffalo made by canal boat over the old Erie canal.

He was educated in the common schools of Buffalo.

During his youth the family moved to Bowmansville, Erie county, N. Y., his father keeping his office in Buffalo, and while at Bowmansville, Theodore G. showed his varied abilities by successfully engaging in music teaching, painting and the printing business.

He became interested in the study of dentistry, and finally went to Philadelphia where he attended the Pennsylvania College of Dental Surgery, (now the U. of P.) and received his degree of D.D.S., in February, 1862.

Shortly after this he tried to join a company of Zouaves at Buffalo for Civil War Service, but was rejected on physical grounds. Interesting to note that the Company of Zouaves which he tried to join were annihilated in their first engagement. Then he trained a company of Bowmansville volunteers, admitting in later life that he did it by keeping one page ahead of them in the old manual of drill regulations.

He took up the practice of dentistry in Buffalo with his father. After the father retired he continued with his brother Angelo C., who was also a dentist.

The printing business remained a fascination to him, and he edited numerous pamphlets under the *non de plume* of L. Theo. Garwood. Later he made contributions to one of the Buffalo papers in the nature of a "colyum" headed, Facts, Fun and Fancies. In 1865 he ran a series of articles in the papers, signed "Tooth Pick," urging better care of teeth.

He always leaned more to the prosthetic side of dentistry. His father was more or less of a mechanical genius, so Theo. G's. was probably inherited.

Later in life he became more deeply interested in mechanics, and in 1873 was general manager of the International Industrial Exhibition, given in Buffalo under the auspices of the old Mechanics Institute.

At the meeting of the Buffalo City Dental Association held September 4, 1865, also in October of the same year at the meeting of the Western New York Dental Society, Dr. Lewis first publicly exhibited the original automatic plugger. Subsequently Snow & Lewis commenced the manufacture of the instrument, and since 1867 this and other Lewis inventions have been continuously manufactured by the Buffalo Dental Manufacturing Company. Since 1891 the company has operated under his presidency and he has given continuous and personal supervision to its output. His wide activity and intelligent research in the field of dental mechanics are indicated by the number of dental appliances bearing his name as inventor or designer.

Up to the day of his death he kept the needs of the profession in mind and endeavored to provide the necessary mechanical conveniences for the practice of advanced methods in dentistry.

The last appliance perfected under his supervision is an electrically operated and controlled dental vulcanizer.

For twenty-two years he was editor of the "Dental Advertiser" afterward renamed the "Dental Practitioner and Advertiser" under Dr. W. C. Barrett's editorship.

The several hobbies which he followed at different times were:

Music—Conducted an orchestra at his home for many years. Extensive musical library.

Vases—Had quite a collection, purchased at intervals throughout his life.

Etchings and Paintings—Several of his possessions have been shown at loan exhibitions at the Albright Art Gallery.

War Medals and Decorations of Honor—Collection ranked among the finest private ones in the country. This was his last big hobby and he was adding specimens from the great war at the time of his death.

Oriental Rugs.

Personal Library—Containing books of reference in all his hobbies, as well as the Lewis Dental Library at the Grosvenor Library turned over upon retiring from practice, and since kept up-to-date by his continued donations.

Leaves widow, Catherine M. Lewis; son, John H. Lewis; daughter, Mrs. Alfred V. Ednie; grandchildren, two; brother, James V. Lewis.

The only organizations of which he was a member, are: Sons of the American Revolution, Albright Art Gallery, State Historical Society and the Dental Societies.

Dr. Frank W. Low succeeded to the practice of Dr. Lewis in 1891, when the latter assumed the presidency of the Buffalo Dental Mfg. Co. They had been office associates for four years prior to 1891. He writes:

> "My four years experience in the office of Dr. Lewis was more educational than a previous preceptorship and my college education together. A more honorable and straightforward gentleman I never knew."

In assuming editorial control of the Dental Advertiser, the late Dr. W. C. Barrett wrote: "For two and twenty years 'The Dental Advertiser' had been conducted by one man until it had become so identified with his personality that it seemed as if Dr. Lewis *was* the 'Dental Advertiser.' New duties have forced him to relinquish the position that he so long held with credit to himself and profit to the profession." In typography and content it reflected the character of the man.

Dr. Lewis was a remarkably public spirited man. When he retired from practice he gave his entire professional library to the Buffalo Grosvenor Reference Library, and during the succeeding years made yearly donations of value.

The June Bulletin from "The Grosvenor" of this year contains the following mention:

"Dr. Theo. G. Lewis, upon being asked for advice concerning some eight or ten new dental text-books, replied that they were good, but not to buy them as he would present them, which he did."

His love for music led him to maintain an amateur orchestra which he conducted at this home. Once or twice each year they went to the Buffalo State Hospital and gave a concert to the inmates. Dr. Andrews the superintendent in those days, assured the writer that following each such occasion, for weeks the behavior of the poor unfortunates under his supervision responded with marked improvement both mental and physical.

Many a boy under the doctor's teaching graduated into Buffalo professional orchestras, and several are now leaders of our best orchestral organizations.

Dr. Lewis in all his undertakings was most thoroughly painstaking. Nothing that ever came out of the factory of the B. D. M. Co., since his presidency, could be made more artistic or more perfect in its construction. This has frequently been commended on both by dental dealers and by our profession.

While never a prig, the doctor's motives and actions during his long life were ever most exemplary.

Dr. Lewis' discriminating appreciation of all works of art was remarkable. The contents of his beautiful home attest especially to this gift of discrimination. It is a matter for consolation too that he retained fully all his brilliant faculties to the advanced period of his ever active life.

RESOLUTIONS OFFERED BY DR. LOW, CONCERNING THE DEATH OF DR. THEO. LEWIS, BUFFALO, N. Y.

Resolved, That in the death of Dr. Lewis, the Eighth District Dental Society has occasion to mourn the loss of one of the most public spirited, generous, straightforward and honorable men who ever practiced dentistry.

Born December 14, 1836, he had more than rounded out the full span of a remarkably useful life acquitting himself always to the honor of our profession.

While we deplore his loss, it is with thankfulness that our bereavement is tempered by the knowledge that even to the hour of his death he retained full possession of all his faculties, and that the Almighty was merciful in not permitting him to suffer long.

Resolved, That throughout his eventful life in which he achieved that character and degree of true success which money cannot buy, therefore be it resolved that memorial pages be set apart in the records of our society in order that his achievements may be more fully chronicled to the purpose that we may each strive to emulate his example and thus accomplish the things worth while in all life's endeavors.

Resolved, That the Dental Magazines be requested to publish suitable obituaries, and that together with these resolutions, copies be given to his bereaved widow and to her family.

SUGGESTIONS

Conducted by F. R. Chapman, M.S., D.D.S., Columbus, Ohio

(*To Our Readers: Give others the benefit of your practical suggestions by sending a description of them to Dr. F. R. Chapman, Schultz Building, Columbus, Ohio.*)

Wax Model Additions

It is well to have in the case wax of two quite different colors. Sometimes you wish to build out an inlay model for additional contour or better occlusion. If you make the addition with wax of a different color you can see exactly where and how much you add.

—*Garrett Newkirk, Dental Facts.*

Synthetic Fillings

Where one is to make a synthetic or oxyphosphate filling, and where it is impossible to use the rubber dam, paint the surrounding gum with dilute trichloracetic acid; this will stop the exudation of moisture from the gum and work can then be carried out in a dry area without fear of having the filling spoiled by moisture.—*J. Levin, Commonwealth Dental Review.*

To Make a Perfect Stone Model

In order to obtain good results give your impression a coat of shellac, and let it dry for one hour; then give it a coating of any oil (3 in 1 is good). Then wash it off a little with cold water, let it stand for fifteen minutes. Mix the stone compound as thick as putty and pack it into the impression. *Do not move it around, as it will become porous.*

—*L. Balter, Dental Cosmos.*

Temporary Cement

I find that a mixture of zinc oxid, seventy-five per cent. by weight and powdered rosin (colophony) twenty-five per cent., as the powder, and oil of cloves as the liquid, makes a very good non-conductive, sedative and antiseptic temporary cement. It may be used as a base filling or pulp capping and I have had good success with it. Its one objection is that it sets very rapidly; therefore, when you mix the liquid and the powder, be sure to mix it thin.—*H. E. Tompkins, Dental Items of Interest.*

Conservatism in Extracting

I protest against the too free use of the therapeutics of organic mutilation. If the craze for violent removal goes on, it will come to pass that we shall have a gutless, glandless, toothless, and perhaps, thanks to physchology and surgery, a witless race.—*C. K. Mills, M.D., A.M.A. Journal,* per *Dental Register.*

"Dead Teeth"

A tooth which has lost its pulp is a "pulpless tooth" but not necessarily a "dead tooth," any more than a tooth affected with pyorrhea alveolaris and having lost its peridental membrane is a "dead tooth." This term is properly applied when both the pulp and peridental membrane are lost.—*Elmer Best, Oral Health, per Dental Register.*

Root Restoration of Perforated Lower Molars at the Bifurcation

Fit a piece of pure silver wire in each root canal; make a wax pattern, pulling the silver wires out with the wax; carve as desired. Cast with pure silver. Inflammation of the septum between the roots will not follow. The silver ameliorates the condition.—*E. P. Bateman, Commonwealth Dental Review.*

Small Cavities

Unfortunately it was the custom years ago to allow cavities to reach what we term a reasonable size under the impression that we were being conservative for the benefit of our patients, but we know now that no cavity will ever stop growing of its own accord and, consequently, we must do our duty and fill small cavities at the first opportunity.

—*Rea Proctor McGee, Oral Hygiene.*

To Prevent Discoloration

A small piece of paraffin is inserted into the pulp chamber, a small ball burnisher is heated and the paraffin is melted and applied with it to every part of the cavity. This will prevent the silver solution from penetrating into the crown. If the opening to the root-canal should happen to be blocked by the paraffin, it can easily be opened again with a smooth broach.—*Bernard Fischler, Cosmos*

Anneal a Lingual Bar

In the construction of lingual bar cases for partial lower dentures where the bar is to be soldered to gold saddles, the bar should be thoroughly annealed after bending and final adjustment has been completed, otherwise the heating in soldering will cause the bar to spring, and the case will not go back to place properly on the cast, and failure will result in the mouth. This result will also obtain in vulcanite cases unless bar is annealed before final adjustment.—*Victor H. Fuqua, Dental Facts.*

Vulcanite Repairs

In repairing a vulcanite denture, if one or more teeth are to be added, the following method will be found very practical: Soften a little wax or Stents' composition and press into the vacant spaces on the denture, insert the denture in the mouth, ask the patient to bite into it and to keep the mouth closed until the composition is hard. By running plaster into this and forming a base a very reliable bite can be obtained.

—*G. W. R., Dental Magazine.*

CORRESPONDENCE

American Dental Library and Museum Association

The third annual meeting of the American Dental Library and Museum Association, was held in Boston, August 23 and 24, 1920. The first, taking place at the Forsyth Institute, the second, in Mechanics Hall.

The attendance was larger than at the previous meeting and considerable progress was made in its development showing the need of such an organization.

For the benefit of those not acquainted with the association, the object of the organization is to encourage the formation and development of dental libraries and museums, both public and private.

Dr. Wm. Bebb presented a paper which will appear in the *Journal of the National Dental Association,* "Collecting and Maintaining a Dental Museum and Library."

It is our intention to present papers pertaining to dental libraries and museums at all our meetings.

Since the index on dental literature is now a certainty, dental libraries will be a necessity and it is our hope of fostering such institutions, and we trust all dental associations and universities will lend a helping hand.

The following is a list of institutions, societies and individuals who became charter members at the Boston meeting:

Chicago Dental Society, L. H. Arnold, Lib., 3154 Indiana Ave., Chicago; Denver Dental Association, H. F. Hoffman, 266 Metropolitan Bldg., Denver, Colo; Eighth District Dental Society, State of New York, Arthur F. Isham, Lib., 85 N. Pearl St., Buffalo, N. Y.; First District Dental Society, State of New York, B. W. Weinberger, Lib., Academy of Medicine, 17 West 43 Street; Kansas State Dental Association, Wm. A. McCarter, Lib., 709 Mills Bldg., Topeka, Kan.; Dalhousie University, F. W. Ryan, Lib., Halifax, N. S.; Montreal University, School of Dental Surgery, Eudore Dubeau, 380 Hubert Street, Montreal, Canada; New York College of Dentistry, Chas. Vetter, Lib., 205 East 23rd street, N. Y.; Northwestern University, Dental Department, Wm. Bebb. Lib., 31 W. Lake street, Chicago, Ill.; Ohio College of Dental Surgery, Henry T. Smith, 7th and Mound streets, Cincinnati, Ohio; Royal College of Dental Surgeons of Ontario, C. A. Kennedy, 2 College street, Toronto, Ont.; University of Buffalo, College of Dentistry, Arthur F. Isham, Lib., Buffalo, N. Y.; University of Iowa, Dental College, O. E. Schlaubusch, Iowa City, Ia.; University of Pittsburgh, H. E. Friesell, 1206 Highland Bldg., Pittsburgh, Pa.; Vanderbilt

University, Dental Library, Pearl C. Hedges, Lib., South Campus, Nashville, Tenn.; Cleveland Dental Library Association, Henry L. Ambler, Curator, Rose Bldg., Cleveland, O.; Dental Cosmos, L. P. Anthony, Lock Box 1615, Philadelphia, Pa.; Forsyth Dental Infirmary, Frederick A. Keyes, Boston, Mass.; Ohio Dental Library Association, E. C. Mills, Columbus, Ohio; Rochester Dental Dispensary, H. J. Burkhart, Director, Rochester, N. Y.

Individuals: Theodore Blum, 140 West 57th street, N. Y.; Thomas D. Dow, Stanton, Mich.; Samuel Grief, 246 New Lots Avenue, Brooklyn, N. Y.; B. E. Lischer, 3905 Olive Street, St. Louis, Mo.; Morris Mestel, 140 West 42nd Street, N. Y.; Wm. H. Trueman, 47 High Street, Germantown, Penn.; Andris G. Weber, Corrales 1, Esq. a Egido, Havana, Cuba.

District of Columbia Dental Society, B. Edwin Erickson, 1624 I Street, Washington, D. C.

1920 Classification of Dental Schools of the United States by the Dental Educational Council of America

CLASS A

University of Southern California, College of Dentistry, Los Angeles, Cal.
University of California, College of Dentistry, San Francisco, Cal.
Northwestern University Dental School, Chicago, Ill.
University of Illinois, College of Dentistry, Chicago, Ill.
University of Iowa, College of Dentistry, Iowa City, Iowa.
Harvard University Dental School, Boston, Mass.
Tufts Dental College, Boston, Mass.
University of Michigan, College of Dentistry, Ann Arbor, Mich.
University of Minnesota, College of Dentistry, Minneapolis, Minn.
St. Louis University Dental School, St. Louis, Mo.
Creighton University, College of Dentistry, Omaha, Nebraska.
University of Buffalo, Dental Department, Buffalo, N. Y.
Ohio State University, College of Dentistry, Columbus, Ohio.
North Pacific Dental College, Portland, Ore.
University of Pittsburgh, College of Dentistry, Pittsburgh, Pa.
The Thomas W. Evans, Museum and Dental Institute, University of Pennsylvania.
Vanderbilt University, School of Dentistry, Nashville, Tenn.
Medical College of Virginia, School of Dentistry, Richmond, Va.
Marquette University, College of Dentistry, Milwaukee, Wis.

CLASS B

College of Physicians and Surgeons, Dental Department, San Francisco, Calif.
Colorado College of Dental Surgery, Denver, Colo.
Georgetown University, School of Dentistry, Washington, D. C.
George Washington University Dental School, Washington D. C.

Howard University Dental School, Washington, D. C.
Atlanta-Southern Dental College, Atlanta, Ga.
Louisville University, College of Dentistry, Louisville, Ky.
Chicago College of Dental Surgery, Chicago, Ill.
Indiana Dental College, Indianapolis, Indiana.
Loyola University, School of Dentistry, New Orleans, La.
Tulane University, School of Dentistry, New Orleans, La.
Baltimore College of Dental Surgery, Baltimore, Md.
University of Maryland, Dental Department, Baltimore, Md.
Washington University Dental School, St. Louis, Mo.
Kansas-City-Western Dental College, Kansas City, Mo.
University of Nebraska, College of Dentistry, Lincoln, Neb.
New York College of Dentistry, New York, N. Y.
College of Dental and Oral Surgery of New York, New York.
Western Reserve University Dental School, Cleveland, Ohio.
Ohio College of Dental Surgery, Cincinnati, Ohio.
Philadelphia Dental Colleges, Philadelphia, Pa.
University of Tennessee, College of Dentistry, Memphis, Tenn.
Meharry Dental College, Nashville, Tenn.
Baylor University, College of Dentistry, Dallas, Texas.

CLASS C

Jersey City Dental College, Jersey City, N. J.
University of West Tennessee, Memphis, Tenn.
Texas Dental College, Houston, Texas.
Cincinnati College of Dental Surgery, Cincinnati, Ohio.

NOTE.—These classifications were all made upon the basis of the requirements in force prior to April 30, 1920.

ALBERT LILLIDGLEY, *Secretary.*

NATIONAL ANESTHESIA RESEARCH SOCIETY

To the editor of THE DENTAL SUMMARY:

My attention has been called to an editorial note on page 746 of your publication, in connection with the activities of the National Anesthesia Research Society.

You have very kindly given space and attention to our work and you raise a question which, while it never has been raised in the society itself, is entitled to an answer.

Since the society has taken no action on the question whether or not dentists are "legally qualified" to administer anesthetics, I write to you the provision for membership in the society as contained in our constitution:

"Any individual holding a degree of Doctor of Medicine, or Doctor of Dental Surgery, from a duly recognized college or university, shall be eligible for professional membership in this society as long as he is not associated in any way with any individual, partnership or corporation manufacturing or interested in the manufacture of any anesthetic or anesthesia apparatus."

As a matter of fact, our membership is almost evenly divided between doctors of medicine and doctors of dentistry.

The society feels very strongly that its mission is to disseminate information rather than to formulate conclusions at the present time. Our records would show that the academic attainments of any practitioner are a poor index to his abilities as an anesthetist.

One of the campaigns which will be undertaken early in the ensuing year will favor more comprehensive courses in anesthesia at most of the universities and colleges now giving instruction.

The society has been asked to take a position on several of the moot questions in the specialty, but has uniformly refrained from becoming party to controversial subjects, holding that its usefulness will be greater if it tries to assist all engaged in forward looking work rather than attempting to decide between the merits of such workers.

THE OBJECTS OF THE SOCIETY ARE:

First, to promote the science of anesthesia and to enable its members, or others, to submit to the dental and medical professions any views, findings, or accomplishments they have attained.

Second, to obtain from all available sources, information concerning any materials, liquid or gas, known to have anesthetic properties.

Third, to arrange, in cooperation with dental, medical, and anesthesia associations, for the preparation and delivery of suitable, interesting and educational papers on the general subject, or relative to some particular anesthetic.

Fourth, to use its influence to avoid the publication or circulation of any false or unauthentic statements concerning the science or practice, or about any anesthetic.

Fifth, to receive and tabulate reports of any and all conditions, symptoms, or phenomena prevailing during or after anesthesia by any anesthetic, and to prepare and distribute on request, forms on which such information can be tabulated with uniformity.

Sixth, to distribute by pamphlet or publication, as its funds may permit, such reliable data as may be collected or obtained from those interested in the subject.

Seventh, to aid, as far as possible, in the preparation, publication, and sale of suitable text-books on the subject of anesthesia, and to prepare as rapidly as possible, reference books for use by the medical and dental professions.

Eighth, to cooperate with the state authorities in the preparation of suitable legislation to safeguard those to whom an anesthetic is to be administered, as well as those called upon to administer it.

Ninth, to arrange for the production of moving picture films to illustrate to the profession the action of anesthetics on the patient during induction and anesthesia, and to prepare interesting articles for publication in magazines and the public press.

Tenth, to use its influence in every way possible and to give its aid toward the advancement of the science of anesthesia.

Very truly yours,

T. T. Frankenberg, *Ex. Secy.*

16 E. Broad street, Columbus, Ohio.

RESOLUTIONS OF RESPECT

Whereas, In view of the loss we have sustained by the decease of our friend and associate Doctor Monroe Palmiter, and of the still heavier loss sustained by those who were nearest and dearest to him; therefore, be it

Resolved, By the Hocking Valley Dental Society, that it is but a just tribute to the memory of the departed to say that in regretting his removal from our midst we mourn for one who was, in every way, worthy of our respect and regard.

Resolved, That we sincerely condole with the widow and relatives of the deceased on the dispensation with which it has pleased Divine Providence to afflict them, and commend them for consolation to Him who orders all things for the best, and whose chastisements are meant in mercy.

Resolved, That this heartfelt testimonial of our sympathy and sorrow be spread upon the records of the society and a copy thereof be transmitted to the widow of our deceased brother, and to each of the newspapers of Lancaster and to The Dental Summary.

Dr. J. H. Stuckey,
Dr. J. C. Stover, *Com.*
Dr. H. B. Eyman, *Secretary.*

PROPER FLUXES

The world may offer us less opportunity in the future than in the past, but it doesn't hinder us from getting more out of ourselves

SCIENTIFICALLY formulated fluxes are indispensable in every casting and soldering operation, because the character of the flux employed directly affects the results obtained.

NEY'S FLUXES

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have been prepared as the result of thorough investigation of dental casting and soldering requirements and are pre-eminently fitted to aid in accomplishing the best results.

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For Gold, Silver, Platinum and Their Alloys.

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NEWS and OPINIONS

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A complete lecture set, consisting of thirty-six slides and a carefully prepared manuscript covering the subject of mouth hygiene furnished to those wishing to give platform lectures. For rental terms apply to George F. Burke, 741-43 David Whitney Bldg., Detroit, Michigan.

Cause and Effect

The saloon evil brought prohibition upon the land. I sometimes wonder whether the "Get-the-money" policy of some of our most modern, up-to-the-minute dentists is not responsible for the existence and tremendous prosperity of the quack advertiser. I recently heard of a case in which the patient presented to one of our top-notchers for prophylaxis, as she supposed. One look into her mouth, and the dentist declared that it was a "bad case," and stated that his fee would be at least $350. Across the hall was the office of an "old-fashioned" dentist who had done good work for her family for many years. Repairing thither she had her teeth cleaned and two small cavities filled, the total fee being under $10. There simply was nothing more needed. All done in an hour and everybody pleased. Don't kill the goose that lays the golden eggs, brethren.

Had a somewhat similar experience, myself. Sent a pyorrhea case to a dentist whom I knew to be able to do the work properly. I agreed to supply the remedies without charge, for the benefit of the clinical experience. Met the patient a few days later and was surprised to learn that the dentist of my selection had named a fee of $350, demanding one-half of it in advance. What was to be done? The patient was a friend of mine; so are most of the dentists who know me. Without letting my name be known in the matter, I sent the patient to another and equally skillful man, as far as reputation goes, who undertook the case with complete success, for a total fee of $75, which seems to me to be ample, as I know the work. I am sorry to say that I find many cases in which practitioners who are models of ethical propriety with regard to their treatment of fellow-dentists, seem to forget that they owe another and a higher ethical duty to humanity as represented by that small section of the public which comes under their hands. 'Snow use; the law of Compensation is right on the job day and night. There's just one way in which a dentist or any other man can win permanent prosperity and that is by holding the good of others as of higher consequence than his own pecuniary emolument. Get it?

Christmas good will and New Year's wishes have become so much a matter of form without real feeling that one must hesitate at their expression, even when very real and altogether genuine. If there is one thing that I dislike more than another it is conventional formalism, and yet I know very well that such things round off many of the sharp corners of life, and make progress through the world a matter of less difficulty and annoyance. Having thus expressed myself, I wish to say to readers of my stuff, individually and collectively, that they have my best wishes for health, happiness and prosperity, and that I am here to do my level best to help to make my wishes for them an active factor in their lives. If there is at any time anything that I can do for any member of the profession, a simple request will start the wheels to moving

Once more I call upon readers of The Summary for suggestions as to how the magazine can be improved and made still better. I certainly believe that The Summary during 1920 has taken on a distinctly new character. Other magazines specialize on Theory, others on "Get the Money;" while this magazine has the ambition to be the repository of worked-out conclusions, of actual findings in individual and collective research, in that manner realizing our efforts to make it "The one professional magazine that no dentist can afford to be without." I am very proud of The Summary, and am ambitious for it to the same degree. Therefore, I ask every friend of the magazine to send to me his suggestions, in order that it may, in the future, still more completely supply the needs of every dental practitioner.

To Secretaries of Dental Societies: Will you please send to me, care of The Dental Summary, Toledo, Ohio, your name and local address? It is my purpose to undertake an important piece of work, helpful to all dental organizations, in which you can be of very material assistance. As soon as I have your address I shall write to you, explaining fully my purpose, and nothing is to be done without your knowledge and full consent.

For the next few months dentists should be very careful, unusually careful, about investments. Unless you have complete knowledge of the affairs of concerns offering stocks and bonds for sale, it is better to sit tight, hold on to your money and wait. The month of January will witness more business reverses and actual failures than any month for many years. Even concerns supposed to be entirely solvent, by those best acquainted with their affairs, are likely to have all they can do in weathering the storm and stress due to readjustment of prices. Many officers of such concerns, looking about for a haven, may resort to the offering of new stock, which, in their opinion, seems perfectly good and safe, which may prove to be worthless when the final adjustments are made. Business men are, as a rule, honest; but some of them are too close to their own affairs to get a clear view of their real situation. Under all circumstances that are likely to prevail during the first quarter of 1921, great caution should be exercised by investors. It is very easy to kiss your money good-bye; but by no means so easy to get it back. Especially careful should everybody be in dealing with strangers.

Dentists who have in mind the establishment of free school and municipal clinics will do well to get in touch with local Rotary, Kiwanis and other luncheon clubs. The endorsement of such influential bodies will go far toward putting across any welfare movement of merit, and such endorsements are being given in many places, the latest being at Tampa, Florida. Here in Toledo, we have seen the power of these organizations in local government. They can bring about just about anything that they care to take up.

Medical men and dentists have formed an association at Minneapolis, for the purpose of erecting a large building for the exclusive use of the two branches. Committees have been appointed, and other preliminary arrangements made. Good idea.

Advertisers have taken up nerve-blocking, and are, of course, making the most of it. One good result will be the familiarizing of the laity with the name, at least, thus far making it easier for the entire profession to induce its use where indicated.

Splendid reports of results following Manufacturers' Exhibits in various parts of the south are coming in. These exhibits cost thousands of dollars, and dentists certainly should take advantage of the opportunities offered to become acquainted with the latest and best.

My old friend Bob Gillis, of Hammond, Ind., is likely to find himself famous some of these days. I notice that he is in demand as essayist and clinician before societies. His recent article in THE SUMMARY, detailing his method of supplying replacements immediately after extraction, has attracted much attention.

Dr. S. B. Johnston, Washington, D. C., claims to have a clientele of 40,000 patients in Washington and the nearby towns in Maryland and Virginia, which he has built up in twelve years. Has any ethical dentist anything to say?

Three hundred women who interested themselves in the work of the Central District Dental Society, Worcester, Mass., raised a fund of about $25,000 in a single day, to be used in free clinic work.

Two additional dentists are to be employed to look after the work of the Los Angeles clinic.

Every little while somebody bobs up and lays claim to doing about all the work that was done to inaugurate the movement for the education of the public in oral hygiene. Some of these days I mean to take the trouble to write up the history of that work from its inception in the mind of Dr. George Zederbaum, Charlotte, Mich., through the taking up of the inspiration by the publishers of THE DENTAL SUMMARY, their employment of a lecturer in the person of John W. Dowd, LL.D., and the prosecution of that work until the present stage was reached. It will make interesting reading, and may place at least part of the credit where it is due. Some people possess the happy (?) faculty of capitalizing "every little thing," while others go along doing their duty as a matter of course, following the injunction of Washington: "Permit posterity to huzzah for you."

Any dentist desiring location may do well to communicate with this magazine. There have been several calls of late.

Mr. Able Speaker: Let it be known to your local Rotary Club that you have a message for them. Think you will have no trouble getting an assignment on their program. Then give it to them straight.

Count the number of pages of really important stuff published in THE DENTAL SUMMARY, and each of the other magazines during the past year. Then compare them. We are quite willing to leave the verdict to you.

Haverhill, Mass., city council has made an appropriation sufficient to pay a dentist for his full time in inspecting and treating teeth of school children.

M. D.'s and dentists of Knoxville, Tenn., are planning the erection of a building to cost $180,000, to be used for their offices exclusively.

A jury of women required only twenty-two minutes' diliberation to find Dr. S. Z. Segall, Orange, N. J., guilty of practicing dentistry without a license. Mrs. Thomas A. Edison was on the panel, but was excused from serving because her famous husband was suffering from a severe cold. This was the first jury of women to try a criminal case in the East.

Dentists of Los Angeles tendered a complimentary banquet and presented a handsome Howard watch to Dr. E. L. Townsend, president of the Southern California Dental Association, November 8.

Try your level best so to conduct your practice that it never may be necessary for you to sue a patient or for a patient to sue you. Too many accounts of suits and countersuits between dentists and patients are loading the lay press. I do not believe that such action ever is necessary. A fair understanding, followed by real service, should go far to prevent such unpleasant affairs.

The drug evil is growing tremendously. Might be a good move for dentist to instruct their patients concerning the evil results of such habits, backed up by the statement that they do not use cocain or any other habit-forming drug. I have known several addicts who owe their introduction to the habit to the use of cocain by their physician. No need of any such thing.

The old South Brooklyn Dental Dispensary served over 6,500 patients last year.

Are you in favor of the education of the dental nurse, and her assignment to a regular place in the dental office? I would like to hear from every reader, as the question is one being debated pro and con just now.

Dentists and medics of Bristol, Tenn., are moving in the matter of free clinics. At a joint meeting November 13, the matter was fully discussed, and is to be taken up at a future meeting and plans completed.

Will secretaries of societies and examining boards kindly get their announcements in as early as possible? We design carrying permanent announcements of all meetings during 1921, and would like to have the roster completed as early as possible.

French dentists have taken up the suggestion made at the State meeting here in Toledo some years ago by Dr. Weston A. Price, that phonograph music, properly applied, acts as an effective anesthetic, and are becoming world-famous as painless extractors. Jazz stuff is said to be most popular, as naturally would be expected.

Among the "dental" clippings received last month was one from Newark, N. J., headed: "Irvington puts teeth in Snow Removal Ordinance." One naturally wonders just who was the dentist, and how the job was done. True enough, snow is a good impression material, but hardly to be trusted to hold "finest lines through most intense heat."

Dr. Alfred C. Fones has been named as professor of preventive dentistry in the Columbia Dental College. Preventive dentistry is given as a special course. Dr. Fones is well qualified to fill the position.

Dr. S. R. Meaker, Auburn, N. Y., has been appointed state oral hygiene inspector by the State Board of Regents. Dr. Meaker might get some valuable pointers concerning his new duties by writing Dr. A. G. Buckner, Nashville, Tenn., who has been filling a similar appointment very acceptably in his own state for a number of years.

"Great Tom," the chief bell of St. Paul's cathedral in London, is tolled only on the death or funeral of any member of the royal family, or of the bishop, the dean, or the lord mayor.

Introducing

R & R Soluble Plaster

A NEW, high-grade impression plaster that breaks away from the cast in boiling water. Completely does away with digging and chipping, positively eliminating the possibility of scratching or breaking the cast. Used the same as common impression plaster. Takes and retains the finest lines, and transfers them to the cast.

Packed in 4½ pound cans, $1.25

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The Ransom & Randolph Company
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Aseptic Absorbent Points

(Johnson & Johnson)

Surgically Clean

For Drying Pulp Canals

The observance of the rules of true asepsis in pulp canal operations as now recognized and practiced by leading dentists of this country, necessitates the use of surgically clean absorbent materials for the drying of pulp canals. A marked departure from some of the old methods is imperative. Loose cotton (that was once aseptic) wrapped upon a broach under ordinary conditions, with the fingers will not do.

To attain any degree of certainty in the successful treatment of pulpless teeth the general rules of aseptic surgery must be observed. Absorbent Points are surgically clean. They are to be handled with sterilized instruments only. The fine even taper and wire-like quality of these points admit them to canals inaccessible to any other form of absorbent.

Put up 200 in box, each box in four aseptic compartments,

Sold by leading Dealers in Dental Supplies in every country in the world.
Specify Johnson & Johnson's

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LISTERINE

TOOTH PASTE

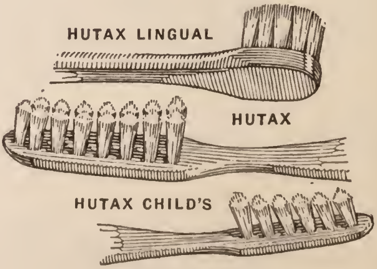
Composed of an unusually efficient neutral cleansing and polishing substance, flavored with the essential oils which impart to the antiseptic solution Listerine its agreeable odor and taste—slightly acidulated with a pleasant fruit acid which deters formation of "tartar" about the teeth and provides mild salivary stimulation.

HUTAX TOOTH BRUSHES

"Hutax" means Mouth Health

We have been appointed United States distributors for these brushes. which were designed by a Committee of Dentists of the International Oral Prophylactic Association. All profit accruing to the Association from their sale is expended for research or education.

The Hutax brush, used in conjunction with the Hutax Lingual brush—which is particularly suited to cleansing the inner surfaces of the incisors, regulating appliances and bridge work—provide the most approved means of tooth brushing. Particulars gladly furnished on request.



Cuts Two-thirds Actual Size

LAMBERT PHARMACAL COMPANY, Saint Louis, U. S. A.

At Morristown, Tenn., a combination of Kiwanis club, Parent-teacher association and local dentists has been formed for the purpose of bringing about the inauguration of a free clinic for school children. A preliminary examination revealed the pressing necessity for the work of such a clinic in the mouths of the children.

Do you realize that in proportion to population the number of dentists grows less every year? Taking into account "wastage," from death, retirement, engaging in other pursuits, the probable graduations during the next five years cannot more than maintain the present proportion to population, which is woefully below the normal requirement. Practitioners should encourage young men and young women to enter the profession. Its rewards are sure and ample, the demand is increasing with leaps and bounds, every appointment book is crammed with dates, while hundreds of communities are without dental service. The future of the profession is assured, with not the remotest danger of overcrowding. To be sure, certain localities may, and necessarily must feel the result of retrenchment and readjustment; the day of spending money like dunken sailors for dentistry or anything else is over until the next spasm strikes us; but there is no business, no profession, that offers so sure and steady an income. Demands above normal are certain to reach an end; but the normal income is amply sufficient, with a constant and dependable growth.

Effort is being made to induce Columbus, Ohio, school board to take over the free clinic established several years ago by Columbus dentists and supported almost exclusively by them since its establishment. An occasional drive for funds has made it possible to retain one dentist and an assistant on full time.

Dr. Walter G. Hutchison announces the opening of his dental offices, 1521 Main street, Columbia, South Carolina. Practice limited to X-ray, pyorrhea, exodontia and surgery.

St. Louis, December 14.—The first class in military dentistry ever held in the United States was conducted in the dental college of St. Louis University yesterday by Major Robert W. Kerr, U. S. Medical Corps. Major Kerr explained to the 171 sophomores and freshmen who constitute the R. O. T. C., of St. Louis "U", that while similar classes would be established in nine other class "A" dental schools of the United States, the St. Louis University unit is the only one now fully organized.

According to Major Kerr, the course will take four years, including plastic surgery and the treatment of gun-shot wounds of the jaw and face. At the conclusion of the course, each graduate of the St. Louis University College of Dentistry will receive a commission as a 1st Lieutenant in the Dental Reserve Corps of the United States Army, and all regular officers of the Dental Corps will in future be drawn from this reserve.

Hearing is the only sense which is not active in the new-born child, that sense being dormant until the third or fourth day.

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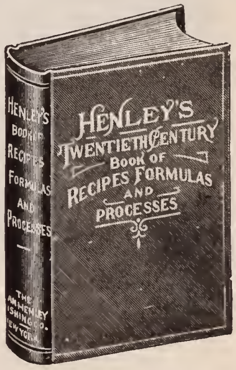
Ever Offered to the Public
1920 EDITION—JUST READY
Henley's Twentieth Century Book of
RECIPES, FORMULAS AND PROCESSES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PRACTICAL RECEIPTS
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HOW TO MAKE EVERYTHING
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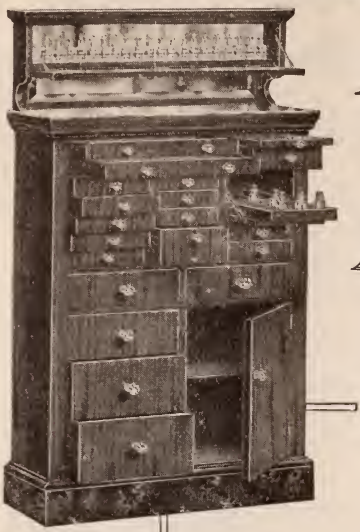

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Dental Cabinet No. 97 is especially suitable for narrow offices but sufficiently deep so as to be well balanced, giving a pleasing effect in any office. The medicine top contains sixteen labeled bottles in a row—not one in front of any other.

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The illustration gives a very good idea of the distinguished aspect possessed by cabinet No. 97 when in active service at the operator's side. It is just as convenient and practical as it is appealing.

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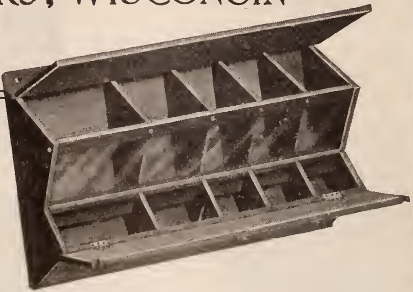

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A feature of this combination Plaster and Investment Material Bin. One large bin for ordinary plaster, smaller one for finer Impression Plaster and three small bins—one of which may be used for pumice, one for crown and bridge, and the other for inlay investment material.

Dr. L. E. Custer Deservedly Honored

Dayton, Ohio., November 28.—More than seventy-five were present last night at the testimonial dinner given to Dr. Levitt E. Custer, internationally known for his electric dental inventions, by the Miami Valley Dental Society.

Telegrams from professional friends of Dr. Custer from all parts of the United States were read. Dr. Custer was formally made president emeritus of the society, with the honorary title of "Dean of the Miami Valley Dental Society" for the remainder of his life. Dr. Harry L. Oliver, president of the society was in the chair.

A chronology of Dr. Custer's inventions and research work was read as the concluding feature of the program by Dr. J. M. Siegfried. Dr. E. B. Tissard of the invitation committee read the telegraphic responses from all parts of the country.

Among the informal speakers of the evening were Fred Rike, I. G. Kumler and John McIntyre, of Dayton, who recalled a bicycle trip through Europe, which they made many years ago with Dr. Custer; Dr. H. A. Smith, dean of the Ohio Dental college, at Cincinnati, Dr. Charles Mills, of Chillicothe, a boyhood friend of Dr. Custer, Dr. H. A. Hubbard, of Dayton, Dr. Homer C. Brown, Columbus, legislative worker, and H. M. Semans, dean of the dental college at Ohio State university.

New Directory and Data Book

Crain's Market Data Book and Directory of Class, Trade and Technical Papers, now on the press, promises to be of unusual interest to advertisers generally and users of trade and technical papers in particular. It not only lists all of the business publications of the United States and Canada, giving circulations, rates, type page sizes, closing dates, etc., but supplies a market analysis of each trade and profession. Thus the reader is given the basic facts of each line in which he may be interested, including its buying power, buying methods, character of requirements, etc. The volume, which is bound in cloth and contains nearly 500 pages, is published by G. D. Crain, Jr., 417 S. Dearborn street, Chicago. The price is $5.00. Orders in advance of publication are being accepted at the rate of $3.75.

At the annual meeting of the Arizona State Dental Society held in Phoenix last week, the following officers were elected for the ensuing year: President, W. D. Shackleford, Phoenix; vice-president, W. G. Barackman, Chandler; secretary-treasurer, J. C. Roberts, Phoenix.

Same With the Bill

Mrs. A.—How did your new suit impress your husband?

Mrs. B.—He gave the tight skirt a sober look.—Boston Transcript.

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Stain Remover

Positively removes all stain and discoloring from the teeth. Softens tartar, and makes scaling easier. Will not injure gums.

Enables the dentist to do more efficient work by reducing pain and annoyance to the patient.

Easily applied with a pledget of cotton.

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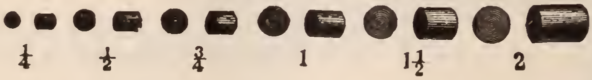

These cylinders are semi-cohesive, made from corrugated gold, and are made cohesive by annealing.

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Great Work in Philadelphia

Philadelphia, Pa., November 21.—Several hundred thousand children in Philadelphia schools are being taught that the care and preservation of their teeth is one of the greatest requirements for continued health and efficiency in adult life as a result of activities by the Division of Child Hygiene of the Bureau of Health.

Lessons in brushing teeth regularly, examinations by experienced dentists which result in careful diagnosis of tooth troubles, and recommendations for their correction which frequently prevent much suffering in after life form a complete system for the improvement of teeth treatment.

An idea of the work accomplished in the dispensaries was given yesterday by Dr. C. Lincoln Furbush, Director of the Department of Health, who pointed out that in 1919 the city's dentist inserted 15,795 fillings, performed 40,956 other dental operations and discharged a total of 9212 patients.

"From these figures it is possible to realize the vast amount of benefit derived annually by patients treated at the dispensaries," said Dr. Furbush. "When consideration is given to the fact that the existing clinics are always filled, it is clear that far more of this necessary service could be rendered were it possible to establish and maintain a greater number of dispensaries.

"The Health Center dispensaries have a dentist in charge from 9 to 12 A.M. and from 1 to 4 P.M., while the school dispensaries have service only from 9 to 12 A.M. This is due to the fact that appropriation for such work does not permit of the appointment of a sufficient number of dentists to allow all the dispensaries to function full time.

The selection of pictures to be sent by wire, which will be historic in the annals of both photography and electricity, was given careful thought. The choice could not have been better: An American Indian and one of the Mississippi river steamers, from St. Louis; New York from an airplane and a snapshot of the Yale-Princeton football game, from New York. An original inhabitant, a typical factor in the development of the West, a great American city and—a great American game.

Charleston, W. Va., November 29.—Governor John J. Cornwell today appointed to be member of the State Board of Dental Examiners Dr. I. J. Kail, of Huntington, president of the State Dental Society, and Dr. O. W. Burdats, of Wheeling. The appointees are to fill vacancies caused by expiration of the terms of Dr. George Beerbower, of Terra Alta, and Dr. D. C. Clark, of Blackville.

Iowa City, November 18.—Alumni of the college of dentistry of the University of Iowa, at the conclusion of their homecoming clinic, elected Frank B. Whinery, of Iowa City, president; J. F. Shoen, of Blairstown, vice-president; R. V. Smith, of Iowa City, secretary, and B. H. McKeeby, of Cedar Rapids, treasurer. A member of the executive committee to succeed J. G. Hildebrand, of Waterloo, will be named later by the new president.

The 1921 meeting of the Northern Ohio Dental Association will be held at Hotel Statler, Cleveland, Monday, Tuesday and Wednesday, June 6, 7, 8, with a rattling good program, "per usual," to be followed by a whale of a P. G. course for the remainder of the week—also "per usual." Keep your eye on the N. O.

Merrill, Wis., November 12.—Lincoln county is the first in Wisconsin to establish a dental clinic for rural schools. An appropriation of $1,000 was made by the county board for this purpose on the request of the county nurse, and supervisor T. J. Metcalf, a former dentist. No permanent fillings, bridge work or expensive operations will be performed, but in addition to extraction of teeth, temporary fillings, cleaning of teeth, etc., advice will be given as to care of the teeth.

Held Pioneer Dental Exhibit

Dr. A. F. Emminger, for many years a dentist in Columbus, now residing in California, attended the recent dental convention at Columbus, recalled the fact that fifty years ago he held the first exhibit in connection with a dental convention in this country. The sessions were held in the top floor of the Chittenden building, northeast corner of Broad and High streets, and the exhibit consisted of one trunkful of supplies and equipment sent by S. S. White, of Philadelphia. The next year a larger exhibit was held in Odd Fellows Temple, So. High street. The exhibit grew until nearly one hundred booths were used at the convention just closed.

The work of Dr. Harry Cope in connection with the exhibits at the Ohio State Dental Convention was so much appreciated by the exhibitors that suitable tokens of such appreciation were presented to him.

Lincoln, Neb., December 8.—An organization to promote the interests of the dental college of the university of Nebraska was perfected at a recent meeting. Plans were discussed for the establishment of a "Dental Week" which will correspond to the Engineers' Week. An organization of the athletic teams was also discussed. It was decided to ask for convocation hour to enable dental students to attend the general convocations held at the university.

About two hundred students were present. Monthly meetings will be held at which programs will be given and business transacted. The following officers were elected:

President, Leo B. Schreve; vice-president, Gerald Rich; secretary-treasurer, O. F. McAdams; correspondent, A. R. Transus; Executive committee: Norman Lynn, Xi Psi Phi, John Pucilek, Delta Sigma Delta, Dean Clyde C. Davis, faculty; Arthur Zierett, non-fraternity representative.

Cincinnati Briefs

Dr. C. H. Burmeister, Cincinnati, read a paper before a joint meeting of the Interstate Association of Anesthetists and the Odontological Society of Western Pennsylvania, at Pittsburgh, entitled, "The Selection of the Anesthetic for Oral Surgery."

Dr. H. A. Reid, Cincinnati, read a paper before the Dayton Dental Society in November. The title was, "Radiographic Evidence in Oral Surgery Diagnosis."

Dr. Hugh W. MacMillan, Cincinnati, repeated his lecture on "Cysts of the Maxillæ", given at Boston at the National meeting, to the combined Pathodontia and Oral Surgery sections of the First District Dental Society, of New York, at their meeting in November. He also attended several oral surgery clinics while in New York.

Dr. D. P. Snyder is to be congratulated on the results he obtained as chairman of the Oral Surgery and Exodontia clinics, and as chairman of the arrangements committee for the Psi Omega Ohio State Alumni luncheon. The clinics were always crowded and about one hundred and fifty men sat down to the banquet.

The Le Maire Study Club of Cincinnati, put on its first clinic at the Ohio State meeting. Judging from the comments and the crowds around the tables the clinic was a great success. Dr. Harry Cope, chairman of the arrangements committee gave them the prize for preparedness. The club furnished signs, table coverings, banners, lights, extensions and everything necessary to carry on the clinic at its own expense.

Kentucky—Jefferson County

Louisville, Ky., November 19.—Dr. E. P. Marcilliat was elected president of the Jefferson County Dental Society, succeeding William E. Goepper, at the annual meeting in the Tyler last night. R. L. Sprau was elected vice-president, and Bruce Funk and Max Dannhauer were re-elected secretary and treasurer, respectively. The subject of the discussion last night was, "The Inlay Unit," which was participated in by E. J. Buechel, George H. Means, C. T. Mathes, Henry Pirtle, Goepper, Sprau and Peck. Report of the Unit appears in this number of THE DENTAL SUMMARY.

Tennessee—Tri-State

Memphis, Tenn., November 10.—The first convention of the Tri-state Dental Association closed here today with the election of the following officers: E. H. Johnson, Pine Bluff, Ark., president; H. D. Chipps, Corinth, Miss., H. D. White, Paragould, Ark., and J. H. Meeks, Himboldt, Tenn., vice-presidents; T. R. Ogden, Memphis, secretary-treasurer.

Shakespeare had a vocabulary of some 15,000 words. The average man has about 3,500, and some have but 1,000.

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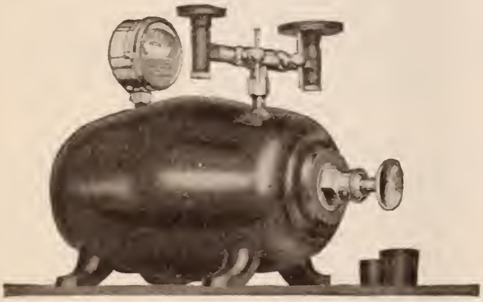

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Indiana—West Central

Lafayette, Ind., November 17.—Election of officers, endorsement of the state board of health plan for reorganization and cooperation in an oral hygiene survey in every school in the district were the chief matters of business consummated by the West Central Indiana Dental Society, in session here today. More than fifty dentists were in session here, representing the counties of Tippecanoe, White, Benton, Carroll, Clinton, Fountain, Newton, Pulaski, Warren and part of Montgomery, which comprise the West Central District.

O. E. Biery, Frankfort, former vice-president, was elected president of the society, succeeding M. E. LeGalley, this city. Leon Smith, of Delphi, was elected vice-president, and the offices of secretary and treasurer, formerly held by G. E. Bell and D. C. Barnhill, respectively, of this city, were combined in one, Guthrie P. Carr being the new secretary-treasurer. The society passed a resolution unanimously endorsing the proposed undertaking of the state board of health for reorganization by new legislation, and the representatives present from the various counties in the district pledged their aid and cooperation in influencing Indiana representatives and senators toward that end as well as creating public sympathy in behalf of the cause throughout the district.

A. R. Ross, president of the State Dental Society, who has been addressing the various district organizations through Indiana on, "The Obligations of the State Dental Association to the Public," recommended a thorough and systematic periodical oral hygiene survey of every child in every school in the district and his recommendations were favorably acted upon by the society, this being the ninth district in the state to support this program. Dr. Ross' address was the principal feature of the morning session. Dr. Ross was followed on the program by a general discussion, after which J. N. Hurty, Indianapolis, secretary of the state board of health, H. A. Cowing, Muncie, president, and Frederick R. Henshaw, a member of the board and dean of the Indiana dental college, made addresses urging support in the reorganization plan and citing the aims and purposes of the health board.

The afternoon session opened at two P.M. with the following scheduled program: Clinics—Inlay Models, E. O. Metzger and A. R. Killian; Crown Work, L. H. Pearlman; Cast Crown and Bridge Work, Paul A. Risk; Short Cuts, J. C. Schermerhorn, Flora; Practical Cases in Crown and Bridge Work, C. N. Wilson, Flora; Anterior Carmichael Bridge, O. V. Kingery, Frankfort; Gum Carvings and Tin Foiling, D. M. Roth; Repairing Porcelain Crown After Absorption, C. C. Reddish, Frankfort; Use of Amyl Nitrite, W. S. Walters.

Dr. Walters was made a member of the Ad-Interim committee, succeeding G. E. Bell, the other members being J. W. Rhodes, Attica, and C. N. Wilson, Flora.

The following committee had charge of the program for the meeting: G. P. Carr, Lafayette; F. B. McAdams, Boswell and L. A. King, Williamsport.

Indiana—First District

Evansville, Ind., November 12.—At the last session of the fifth annual convention of the First District Dental Society, the following officers were elected: President, W. C. Boren, Princeton; vice-president, C. J. Hawkins, Evansville; trustees, Jesse Emerson, Owensville, and A. T. Funkhouser, Evansville.

The trustees named the following officers: Secretary-treasurer, J. E. Walker, Evansville; superintendent of clinics, E. L. Snethen, Evansville; executive committeeman, W. G. Downs, Evansville; master of exhibits, J. O. Zubrod, Evansville. The board of trustees will select the date for the 1921 meeting, which will be held in Evansville.

Connecticut—State

Hartford, Conn., December 12.—The twenty-sixth annual banquet and election of officers of the Horace Wells Club, the Connecticut association of practicing dentists, was held last night at the Hotel Heublein. The banquet was held yesterday to commemorate the seventy-sixth anniversary of the discovery of anesthesia. W. V. Lyon, president of the club, presided and twenty-two members from various parts of the state were present. The newly elected officers follow: President, Albert W. Cary, of Hartford; vice-president, F. T. Murless, of Hartford; secretary and treasurer, Charles McManus, of Hartford; council, A. C. Fones, C. W. Strong and E. B. Griffith, of Bridgeport and N. J. Goodwin, of Hartford. New members elected last night were A. J. Cutting, of Southington and B. A. Sears, A. E. Hunt and C. A. Humphries, of Hartford.

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Washington, D. C.

Washington, D. C., December 8.—Officers to serve for the ensuing year were elected last night when the National Capital Dental Society met in the George Washington University Medical School building.

The officers are: John E. Black, president; Rosalind M. Bayne, vice-president; C. Willard Camalier, secretary; James T. Bradley, treasurer; Starr Parsons, historian and Nora Moyer, librarian.

Missouri—Northwest

St. Joseph, Mo., November 10.—W. M. Goodrich, of Chillicothe, was elected president of the Northwest Missouri Dental Society at the session Tuesday night; H. L. Stinson, of Maryville, was elected vice-president, and Jessee M. Miller, Jr., of Hopkins, was chosen secretary-treasurer. J. C. Savell, of Hamilton was chosen a director to succeed Arch Thompson, of Gallatin. There are three directors, but the other two are hold-overs.

Resolutions were passed to invite the Southwest Iowa, Southeast Nebraska and Northeast Kansas Dental Societies to meet next year in joint session with the Northwest Missouri Society, in St. Joseph.

Iowa—Northwestern

Sioux City, Iowa, December 5.—J. L. Conger, of Sioux City, was elected president of the northwestern district of the Iowa State Dental Society in the final meeting of the convention yesterday. Dr. Miner was elected vice-president, C. E. Westwood, of Sioux City, was re-elected secretary, and J. L. Schott, of Sioux City, was re-elected treasurer.

Dr. G. S. Monson, of St. Paul, Minn., arrived in Sioux City yesterday and conducted a meeting of the Sioux City Dental Study Club last night. Denture Work was his subject.

Dr. R. H. Volland, of Iowa City, Iowa, head of the operative work in the State University of Iowa, spoke on the subject of "Gold Inlays" at the afternoon meeting. Dr. E. H. Bruening, of Omaha, Neb., discussed "The Partial Restoration of Removable Appliances."

Iowa—Des Moines District

Des Moines, Iowa, December 3.—The fourteenth annual meeting of the Des Moines District Dental Society was held here yesterday.

Dr. W. H. Jordan, of Kansas City spoke on "Partial Clasp Dentures." In the afternoon Dr. Forest H. Orton, of St. Paul, spoke on "Crowns and Bridges." Demonstration clinics were held in connection with the lectures.

O. H. Gallagher, of Grinnell, was elected president; F. E. Thornton, of Valley Junction, formerly secretary, was elected vice-president; A. H. Brock, of Grinnell, was elected secretary; Ray G. Miller, of Des Moines, was re-elected treasurer.

DEATHS

Dr. Monroe Palmiter

At Lancaster, Ohio, December 16, 1920, Dr. Monroe Palmiter, of Bright's disease. He was born in Coldwater, Mich., January 16, 1848, and removed early in life with his parents, Dr. and Mrs. Cleborn Palmiter to Ligonier, Ind. where his father became prominent as a physician. Dr. Palmiter after securing a dental license associated himself with Dr. Cummings, of Elkhart, Ind. About 1870 he located in Lancaster where he practiced about fifty years, succeeding Dr. Von Bonhurst a pioneer dentist who removed to California. Von Bonhurst is credited as being one of the first to produce local anesthesia by hypodermic injection.

Dr. Palmiter is survived by his wife Clara H. Boerstler Palmiter, of Lancaster, and a cousin Henry Palmiter, of Hart, Mich. Aside from his profession, Masonry received his earnest attention; he was a thirty-second degree, shriner, and served as presiding officer in each of the local bodies. He was a jovial and genial personage, methodical in his acts and could give accurate data concerning matters of local interest. His records of the weather conditions in his locality covered a long period of years. It is doubtful whether he ever used a set of plain teeth in his vulcanite work, always preferring gum sections, in the grinding of which he was an expert. He was an honorary member of the Hocking Valley Dental Society.

—E. C. M.

At Bakersfield, Calif., November 1, of pneumonia, Dr. D. B. Baker, aged 46.

At Delphi, Indiana, November 9, Dr. Harry Summers, of Burlington.

At sea, on his way to Greece to engage in Red Cross work, Dr. Walter H. Clark, of Greenfield, Mass. The body was returned to his home for interment.

At Birmingham, Alabama, November 2, Dr. Samuel Drummond was shot to death by an uncle in a dispute over money matters.

At a hospital at Tampa, Florida, November 15, of uraemia, Dr. William Rogers Jack, formerly of Chillicothe, Ohio.

At New York City, November 17, Dr. George F. Garno, aged about 45.

At Middletown, Pennsylvania, November 23, Dr. William McNair, a veteran practitioner.

At Goshen, Indiana, November 24, Dr. P. E. Cunningham, aged 52. Heart failure, the result of Bright's disease and other complications is assigned as the cause. He had been ill a year. This is the second recent death in the little group of Goshen dentists, the other being that of Dr. J. W. Stage.

At Venice, Calif., November 15, Dr. L. L. Goodwin, formerly of Topeka, Kansas.

At Fairfield, Calif., November 10, Dr. G. F. Baker, of Twin Falls, Idaho.

Deaths—Continued

At Parker's Landing, Penn., November 10, Dr. W. J. Winsheimer, aged 65.

At New York City, November 15, Dr. John P. Sheehan, aged 28.

At White Plains, New York, November 26, Dr. Cornelius B. Fish, 2d, aged 27.

At Skowhegan, Me., November 30, Dr. Fred G. Danforth, aged 76.

At Brooklyn, N. Y., December 6, Dr. Frank Wickham Norris, aged 46. He was somewhat noted as a playwright.

At Newcastle, Kentucky, December 3, Dr. James P. Gray, aged 50. Suicide by shooting on account of losses in oil investments.

At Newburyport, Mass., December 17, Dr. Edward P. Woods, aged 35.

At Saskatoon, Saskatchewan, Canada, December 8, Dr. John A. M. Moran, aged 44.

At Danielson, Connecticut, December 8, Dr. W. I. Knowles, aged 51.

At Lancaster, Kentucky, December 8, Dr. A. S. Price.

At Buffalo, N. Y., November 28, Dr. Theodore G. Lewis, president of the Buffalo Dental Mfg. Co., Buffalo, N. Y. He was very deservedly well known as a dental inventor.

At Washington, Pa., December 11, Dr. J. L. Fulton, aged 40.

At Baltimore, Maryland, December 10, Dr. G. Marshall Smith. He was a brother of the late Dr. B. Holly Smith, who died less than a year ago.

At Cambridge, Mass., December 10, Dr. Myron E. Pierce, aged 69.

At Dorchester, Mass., December 16, Dr. George A. Lee, aged 52.

At Clifton Springs, New York, December 18, Dr. Charles M. Howe, aged 70. He formerly practiced dentistry at Passaic, N. J., but was president of a bank at that place at the time of his death. He was three times mayor of his town, and founded the free public library.

Coming Events

January 24, 25, 26,—American Institute of Dental Teachers, Indianapolis

February 7,—Iowa State Board, Iowa City

February 9, 10, 11, 12,—Minnesota State, St. Paul

March 3, 4, 5,—Texas State, Dallas

April 11 to 16,—Michigan State, Hotel Statler, Detroit

June 6 to 10, entire week— Northern Ohio, Hotel Statler, Cleveland

A man entered a drug store very hurriedly and asked for a dozen two-grain quinine pills.

"Do you want them in a box, sir?" asked the chemist, as he was counting them out.

"Oh, no, certainly not," replied the customer. "I was thinking of rolling them home.'

Classified Advertisements under this heading, $2.00 each for 60 words or less; additional space, 2 cents per word, single insertion; three insertions or more, special rate on application.

FOR SALE—Practice and part equipment in southern Ohio; population 2500 with excellent surrounding country, established sixteen years. Four rooms, steam heat, electricity and running water. Rents for $10 per month. $3,500.00 practice. Books open for inspection. Price $400.00. Address 130-P, care The Dental Summary.

FOR SALE—High frequency Dental X-Ray machine. Gas tube and tube stand complete $150.00. Address 110-C, care The Dental Summary.

FOR SALE—New Dental Engines, interchangeable for direct or alternating current for laboratory or chair. Made in any style of support. Price from $60 to $95. Address, The Handy Dental Specialty Co., 79 Walnut St., Somerville, Mass. 140-P

FOR SALE—Dental office in town of 5000 within eighty-five miles of Cleveland, well equipped office with all conveniences. Water, gas and electricity, good surrounding farming community. Address 160C, care The Dental Summary.

FOR SALE—Equipment of two offices and laboratory $400,00. Practice amounted to over $4,500.00 in 1920. Am retiring. There are no other dentists here. If you care to live on a beautiful tropical island this is your opportunity. Address, Dr. L. W. Bartel, Santa Fe, Isle of Pines, Cuba. 170-P

MOUTH HYGIENE EXTENSION LECTURES. A complete lecture set, consisting of thirty-six slides and a carefully prepared manuscript covering the subject of mouth hygiene furnished to those wishing to give platform lectures. For rental terms apply to George F. Burke, 741-43 David Whitney Bldg., Detroit Michigan.

WANTED—I wish to purchase a used dental X-Ray outfit. State price and how long it has been used. Address 120-C, care The Dental Summary.

WANTED—A competent operator, one capable of doing high-grade dental work, in a strictly ethical office. Salary or commission. Address, 150-P, The Dental Summary.

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Lasting qualities of course are to be considered, and the life of these tools is a matter of even distribution of carborundum and binder, accurate molding and firing—however, these qualities necessarily exist in wheels that run true and stay true, and they are the chief claims of

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PHILADELPHIA

THE DENTAL SUMMARY
THE MAGAZINE THAT HELPS

Vol. XLI February 1921 No. 2

CERTAIN TYPES OF CAVITY PREPARATION FOR INLAYS*

BY K. W. KNAPP, D.D.S., DES MOINES, IOWA

IF ONE WISHES TO REALIZE fully to what extent the casting process has entered into the practice of restorative dentistry today, let him try for a moment to think what it would mean to practice without it. Richmond or open-faced crowns instead of three-quarter inlays for anterior bridge abutments. Almagam, or large, time-taking, back-breaking malleted foil operations for posterior restorations, and gold-shell crowns for posterior abutments. Bent wire or band clasps instead of cast clasps for removable bridge-work. Swaged cusps and soldered backings instead of porcelain tips, and cast anatomically correct pontics. One might go on for some length, but this list is enough to make one thankful that the casting process *is* a fact, available to any man with energy enough to master it. Our debt to Dr. Taggart is a great one, for no matter who may have first used the casting process, his is the credit for presenting it in a form that could be used. When first presented, it was hailed as a quick and easy method for producing gold restorations, and was so treated, with the consequent inevitable failures that lack of careful technic must produce in any procedure in dentistry. This necessity for attention to detail was carefully expounded by Dr. Taggart, but was disregarded, and is still being disregarded by many, and as a result, castings generally are not what they should be. There has been an advance of course. The introduction of different systems which advocate certain definite procedures has had a tendency to raise the plane higher, but there is still room and plenty of it, for further advance. Certainly no fair minded dentist can see his and other men's inlays fail, after a comparatively short time, without realizing that marginal fit is absolutely vital to success. Smoothness of cast is, of course, a prime requisite, but only so far as to insure a more perfect marginal fit which is the real "pot of gold" after all. If we will look back through these last fifteen years we will realize that this marginal fit is relative. In the first few years of casting history it was rather expected that a certain amount of cement would show after the inlay was set and polished; this was excusable to a certain extent for it was apparently the best we could do. As time went on, and earnest endeavor and research brought forth newer ideas and methods, this marginal discrepancy became relatively less, until, today, we are demanding perfection; which is as it should be. It may be said right here that the degree of perfection reached is attained only by a close study of, and strict adherence to certain physical and chemical laws governing the behavior of materials and forces employed in the process of casting. More individual effort and laboratory experiment must be indulged in to attain the highest degree of perfection. It does not suffice simply to follow blindly, instructions or directions for using machines or materials, without knowing the rules or reasons for those directions. If every dentist who uses the casting process would prepare a difficult cavity such as a mesio-occluso-distal cavity in a molar, and then spend just one evening a week in making wax patterns and castings for it, the whole plane of casting technic would be raised tremendously. If one really wants to know what results he is actually getting, the making of casts for cavities in technic teeth out of the mouth will show him for a certainty. If he can cast such a type as the above so that the marginal fit is so perfect as to defy detection of any discrepancy, he may rest assured that the same technic will produce the same result in the mouth. It would seem, however, that upon those words, "the same technic," hinges the whole problem. For actually to use the same technic means that the cavity should be prepared, the wax warmed and pressed into the cavity, the temperature of the wax maintained, investment materials mixed and manipulated, the wax eliminated and the mold dried, the gold heated and the pressure applied in the same way on each and every case. How often is this done? In fact, by using some of the methods employed how can it be done? In consequence of the variations, some of them extreme, the results obtained vary greatly. For several years the writer made castings following a sort of hit-or-miss method with the usual results. About four years ago, dissatisfaction with these uncertain results caused him to try to develop some definite process whereby the results could be foretold and deliberately determined. It is firmly believed that point has been reached, and in this series of articles the attempt is made to present a definite standardized technic for dental castings. This technic is presented with a full realization that it is not the only method for producing correct castings, nor is it presumed to be the last word on the subject. It has been thoroughly tried out however, each step has a definite reason for being, and finally it has given, and is giving uniformly accurate results; which is, after all, what we are all striving for.

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*The first of a series of articles on Casting Technic written exclusively for THE DENTAL SUMMARY.

Different types of castings require, of course, somewhat different treatment. We shall consider first, therefore, the construction of a gold restoration of lost tooth structure, in other words a cast gold inlay. The first important step is, of course, proper cavity preparation. This subject is such a broad one and has been so thoroughly presented by much more able men than the writer, that only certain phases will be presented. It must be said primarily, however, that upon the proper performance of this first step depends in great part the final result. Seats must be flat and walls true, with a very slight divergence from the perpendicular so that the wax pattern will release perfectly and yet have a tenso-frictional grip. The slightest undercut is fatal; for the wax may be withdrawn in many cases where there is a slight undercut without apparent distortion, but when the casting is made, it will not seat properly without throwing the margin of the undercut wall out of position with a consequent discrepancy and subsequent leakage and failure. For the sake of definite description let us take the case of a lower first molar without caries, for which we wish to prepare an M. O. D. cavity for an inlay to be used as the posterior anchorage of a bridge. A stone technic is used whenever possible for the following reasons: If properly lubricated with very warm water, stones cut more rapidly and with less shock than do steel burs. By using a definite procedure, undercuts may be avoided absolutely; and, when finished, the cavity seats and walls are beautifully smooth and polished. The first cut is made with a five-eighths-inch Jo-dandy Carborundum Disk in the hand-piece, starting it on the occlusal surface at the mesial, and cutting off the contact point by taking a slice from the mesial surface and terminating at the gingival just below the free gum margin. (*Fig. 1*).

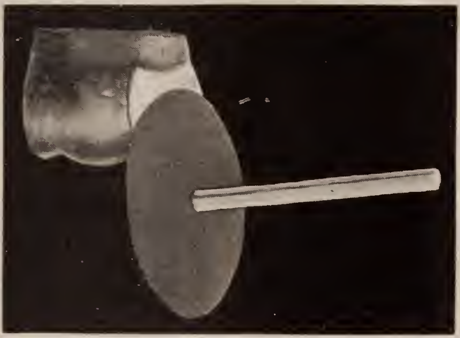

Fig. 1

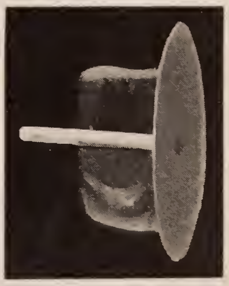

Fig. 2

Fig. 1—Showing first cut with ⅝-inch. Jo Dandy disc on mesial surface. Inclined very slightly toward center of occlusal and making extensions to buccal, lingual and gingival.

Fig. 2—Showing cut with safe-sided ⅝-inch. disk on distal surface. Note inclination of plane of the face of the disk to provide for wax removal.

If the second molar be present a safe-sided disk is used, and a cut exactly similar is made on the distal surface. (*Fig. 2*).

Care is taken in making these cuts to have the disks converge very slightly as they approach the occlusal.

These cuts may be deepened by holding the disk at the same angle against the mesial and distal surfaces so that the buccal and lingual margins may be freely exposed to the tooth brush for thorough cleansing when approximating the adjacent tooth and bicuspid pontic.

The next cut is made with a Miller's mounted stone, No. 344, held in the right angle, making a connecting cut from distal to mesial through the center of the occlusal. (*Fig. 3*).

This cut is made to the depth of approximately one and one-half millimeters. Then take a Miller No. 330 and follow out the fissures to a self-cleansing area. (*Fig. 4*).

Maintaining the same depth of cut, follow this with the No. 329, widening the step until it is broad enough to resist stress tending to tip the inlay bucco-lingually. (*Fig. 5*).

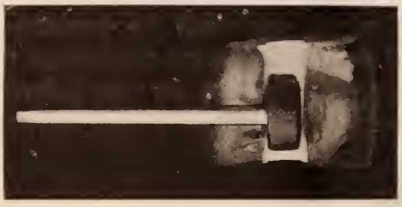

Fig. 3

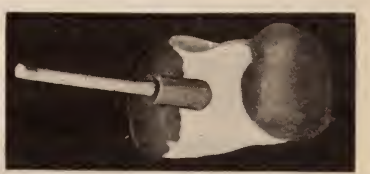

Fig. 4

Fig. 3—Showing connecting cut across occlusal, made with No. 344 Miller Mounted Stone. Depth of cut limited by shank of stone mount touching on tips of buccal cusps.

Fig. 4—Extension of grooves to self-cleansing areas by use of No. 330 stone, showing slight inclination of long axis of stone from perpendicular toward buccal or lingual surface.

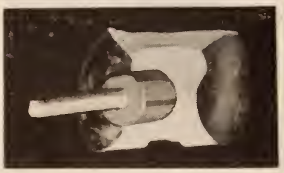

Fig. 5

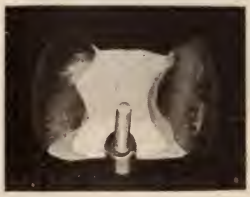

Fig. 6

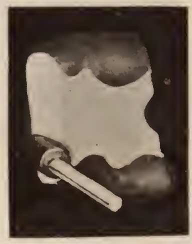

Fig. 7

Fig. 5—Broadening of occlusal step by means of No. 329 stone. Greater diameter of this stone gives wide and flat step quickly.

Fig. 6—Showing No. 327 stone placed in proper position and allowed to sink into mesial surface to form gingival seat and proximal cavity form.

Fig. 7—Showing No. 327 stone being swept buccally and lingually to complete previous step. Note inclination of stone to insure wax release.

The width of this occlusal step, of course, must be governed by the width of the occlusal surface bucco-lingually; as in no case should it be made broad enough to endanger the strength of the buccal and lingual walls. In using these stones they should not be forced, and should be thoroughly wet with warm water applied in a thin stream from the syringe. Also, as they approach the buccal and lingual walls, they should be tipped slightly away from the perpendicular toward the wall; which automatically produces the release necessary for the wax pattern.

It always should be borne in mind that we are not using either 22K or pure gold for these castings for reasons which will be given later.

We are using gold alloys which have a much greater degree of toughness, thus resisting torsion; and of a hardness such as to eliminate danger of "scuffing" or flow under masticating stress. In consequence of these properties of the gold alloy used, it is not necessary to make these cuts as deep as was necessary for pure gold. The pulp, therefore, is not encroached upon to any appreciable degree. This one feature is a most convincing argument in favor of an inlay as an abutment or restoration. The next cut is made with a Miller No. 327 stone in the right angle; placed in such a manner that the base of the stone is on a level with the gingival extremity of the mesial cut as made in *Fig. 1.*

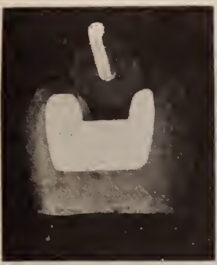

Fig. 8

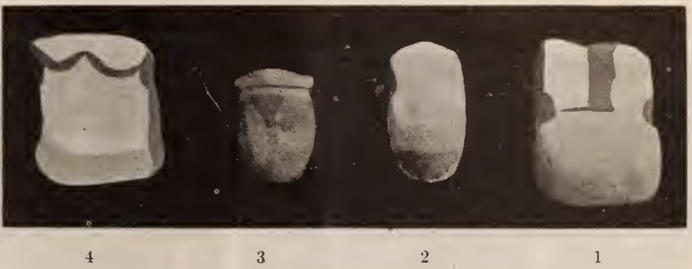

Fig. 9

Fig. 8—Showing beveling of cavo-surface angles by means of No. 244 stone. Gingival margin beveled with Black's Marginal Trimmers.

Fig. 9—Occlusal view of vital tooth preparations: 1, Molar three-quarter preparation; 2, Bicuspid three-quarter preparation; 3, Cuspid three-quarter preparation; 4, Restoration as described in case where gold shell crown was removed.

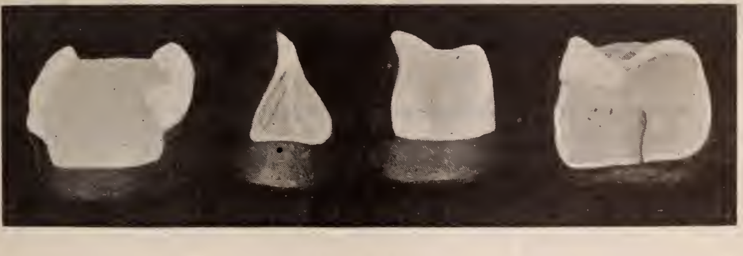

Fig. 10—Proximal view of same preparations, showing beveling of margins and position and direction of retainer grooves.

Starting the stone in a position midway from the buccal to the lingual it is well lubricated and allowed to sink itself into the tooth a little more than half the width of the stone. (*Fig. 6*).

As in the previous cuts, the stone is inclined just a little from the perpendicular toward the center of the occlusal. It is then swept buccally and lingually, inclining slightly as the walls are approached, to again provide for wax release. (*Fig. 7*).

At the distal it is impossible to start a stone of this type without cutting the approximating tooth; therefore it becomes necessary to use a cross cut fissure bur of small size; beginning the cut at the occlusal extremity of the distal cut as in *Fig. 2*, and allowing the bur to cut its way to the gingival; sweeping to the buccal and lingual; using the same inclinations as in the previous step. As soon as this surface is blocked out sufficiently to allow the No. 327 stone to be used, it is placed and used to finish the distal portion of the cavity as was done on the mesial. The line angles at the junction of the buccal and lingual walls with the axial wall are then deepened by using the Miller No. 331½P stone which also smooths the walls to a point where they really glisten. All of the walls of the cavity are gone over with this stone until the whole cavity is clean cut and perfectly smooth. The cavo-surface angles on the occlusal surface are then slightly beveled with a stone such as the No. 244 stone in the hand-piece. (*Fig. 8*). The cavo-surface angles at the gingival also are beveled slightly with Black's Marginal Trimmers, and the cavity thoroughly flushed out with warm water, dried, and carefully inspected. The gingival and occlusal seats should be flat and true, the walls smooth and polished and without undercut, and the whole appear simple and yet very definite as to form. Chisels are not used on buccal and lingual margins for the reason that these margins may be so easily undercut by a slight miscut of a chisel blade. Double bevels on the buccal and lingual walls are avoided, as they are considered unnecessary and add just so many more surfaces to fit. If buccal and lingual margins show any irregularity, it is probably due to some misdirection in handling the stones, and can be corrected by using a medium garnet disk in a right angle mandrel; held in such a manner as to insure its cutting on the margin toward the occlusal first, and working toward the gingival. The face of the

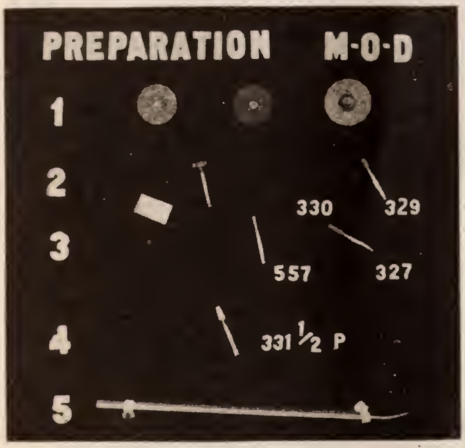

Fig. 11

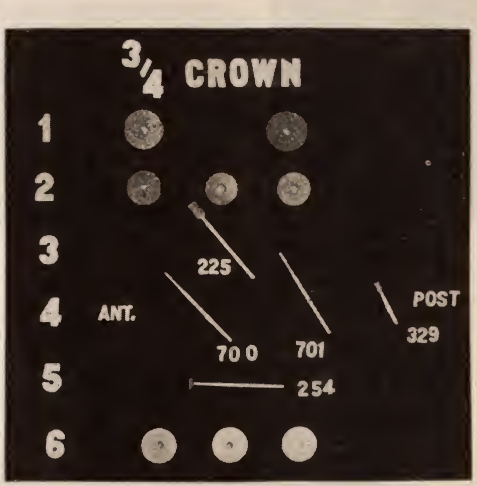

Fig. 12

Fig. 11—Instrumentation chart showing styles of stones and order of their use in the case of M. O. D. preparations.
Fig. 12—Instrumentation chart for three-quarter preparations.

disk should be held as nearly as possible parallel with the buccal or lingual wall.

This may all sound very difficult but is in reality very simple, as each cut is made for a definite purpose; and when that cut is made, the surface or wall is automatically protected against possible undercut, is smooth, and the whole makes a simple, yet perfectly retentive cavity, and is quite quickly done. Don't say it sounds too hard; but just take a freshly-extracted molar and try it. In cases where caries has invaded the tooth there are so many variations that to describe them would take a volume. The same principles are followed in these cases, the caries first being thoroughly excavated, overhanging or undermined enamel broken down, and the cavity filled with Fleck's Cement. The plan of preparation is then thoughtfully worked out, and the same technic employed with such variations as are necessary to fit the case. It has been the unfortunate experience of most all of us, I believe, to note how many bicuspids have had buccal or lingual walls split off; especially in cases where the cusps are long and the sulci deep. It should be our duty, and, in fact, routine practice, in cases where there is the slightest doubt as to the strength of either buccal or lingual cusps, both in bicuspids and in molars, to include those doubtful cusps in the casting. There is no sense in taking any chances, and we may save a great amount of embarrassment by a little forethought. In the case of an upper first bicuspid, for example, we have found the buccal cusp to be somewhat weakened by caries. This is thoroughly removed and the cavity filled in with cement. The regular M. O. D. preparation is then made, and the buccal cusp planed down with a small stone such as the No. 244 to such a degree as will insure a strong layer of tough gold, sufficient to resist even heavy mastication. In most cases this can be beveled much the same as a facing for a bridge, giving sufficient strength without showing gold. If some gold must be shown, however, to insure safety, by all means take the safer way. The preparation of teeth for three-quarter and full cast restorations has been thoroughly described and illustrated by Dr. Tinker in this and other publications. These preparations have given to the profession a means of firm and strong anchorage to vital teeth assuring the maintenance of that vitality which is unequalled by any other method known to the writer. Any dentist who is continuing to use gold shell crowns for posterior teeth, and removing pulps and cutting off the crowns of anterior teeth in order to place a Richmond or similar type crown, is doing both himself and his patient a great injustice. The three-quarter crown has proven itself, in the hands of the operator who has taken the time to master the preparation and construction, to be both strong and esthetic. For this addition to our restorative practice too much credit can not be given to Dr. Tinker; and it is earnestly recommended that his writings be earnestly studied for a correct technic for three-quarter construction*. (*Figs. 9 and 10*). There are very few gold shell crowns in the mouths of our patients which do not cause more or less irritation of the gingival tissues. If we are to restore the mouths of our patients to full health and efficiency, these crowns, being the cause, should be removed and replaced with some form of restoration which will *not* irritate. Sometimes we find, on removing such a crown, that the tooth is so badly broken down that a full cast crown or a porcelain jacket is the only remedy. As a rule, however, the crown band which is causing the worst irritation does so because very little enamel was removed; thus causing a great overhang at the gingival. Frequently in these cases we also find large M. O. D. amalgam or cement fillings in the tooth. In these cases a cast restoration can be made which will restore the tooth to full function without covering up the entire crown of the tooth. The amalgam or cement filling is removed after scaling the root and giving the tooth two or three days' rest. As a rule the tissue will come back to nearly normal in that length of time. Any caries is thoroughly excavated, and the cavity sterilized and filled with fresh cement. The mesial and distal are prepared as for a typical M. O. D. inlay; carrying out the buccal and lingual walls to sound enamel. A step is cut from mesial to distal across the occlusal, and broadened to the buccal and lingual walls. The occlusal surfaces of these walls are trimmed down to sound tooth substance, and the stone is then carried down on the buccal and lingual walls until sound enamel is reached. Sometimes it may be necessary to trim to the junction of the gingival with the middle third of these walls. In many cases, however, much less need be trimmed away. This trimming is done with a stone, and terminates gingivally in a bevel which is maintained in as straight a line as possible to form a graceful finishing line. The remaining sound enamel is then disked and polished, and the result is a clean non-irritating restoration of form and function. (*Fig. 9, No. 4, and Fig. 10, No. 4*).

As before stated it is not the purpose of these articles to dwell over much on cavity preparation in general, as the principles of cavity preparation are quite thoroughly established. The principles, such as extension for prevention, box-like formation, etc., are those principles taught and exemplified by Dr. G. V. Black, with such modifications as seem necessary for the making and withdrawal of a correct wax pattern. Detailed description of different types of inlay cavities may be found in the writings of Conzett, Chayes and others. Cavity preparation like wax pattern making reflects the character of the operator. Care and attention to detail will produce results that are impossible to the operator who uses a careless, slipshod cavity technic. Rounded saucer-shaped cavities produce the same kind of inlays. These, having no retentive form, usually loosen sooner or later. As in all other phases of dentistry, the conscientious, thorough workman prepares cavities correctly for the sheer joy of doing worth-while things in a worth-while way. Cavity preparation alone will show what is the plane of any man's general dentistry. It is up to every one of us to make that plane as high as possible.

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* See illustrated article on Fixed Bridgework, by DR. E. T. TINKER, in March, 1920 DENTAL SUMMARY.—ED.

In the next article I will discuss the "Wax Pattern and Manipulation of Wax."

MEN WHO HAVE MADE GOOD IN LIFE

Henry Ford was a struggling machinist twenty years ago. His income is around $35,000,000 a year today.

A. E. Ruffner, transportation manager of the Erie Railroad, started as an office boy.

S. B. Hunt, vice-president of the Standard Oil Company, started with the company as a truck wagon driver.

Seventy-six of the department heads of Swift's started on less than $8.00 a week for a ten-hour day. Thirty of them started as day laborers.

Ninety-four per cent. of the mine operators of this country started as miners or engineers.

John H. Patterson, president of the National Cash Register Company, was a farmer boy. He started a small general store at a cross-roads called Coalton, Ohio, saw the possibilities of the cash register, and has made himself, his company and the city of Dayton.

Tony Ivan Moss, Oklahoma City, at the age of thirty-five quit his job as an electrician, invented a self-vulcanizing tire patch and in four years was a millionaire.

John Wanamaker started his business life as a helper in a brickyard.

Thomas A. Edison started as a newsboy, studied telegraphy during his spare time and became a telegraph operator.

Andrew Carnegie came to this country in the steerage as an immigrant; became a bobbin boy in a cotton factory, then was a telegraph messenger and an office janitor, studied nights until he had secured his education.

John D. Rockefeller was a farm laborer from twelve to sixteen years of age, and office boy at seventeen.

Charles M. Schwab was a grocer's delivery boy at fourteen.

Theodore N. Vail was a farm laborer, studied telegraphy and became a telegraph operator.

Abraham Lincoln was a store clerk at fourteen.

William B. Joyce, president of the National Surety Company, the largest institution of its kind in the world, was a newsboy at five years old.

John Moody, Wall Street's greatest expert and statistician, was an errand boy at twenty-one years of age.

Charles W. Patterson, president of the Austin-Nichols Company at thirty-nine, was a delivery boy at sixteen.

Edmund D. Hulbert, president of one of Chicago's largest banks, was a bank runner at seventeen.

George J. Whelan, founder and president of the United Cigar Stores Company and the United Retail Stores Corporation, began life as a $3.00 a week cash boy.

A. L. Whitaker, president of the Whitaker Paper Company, Cincinnati's largest paper house, commenced life on a farm.

Charles Lee Cook, conceded to be one of America's greatest mechanical and architectural geniuses, has never walked a step in his life, having no use of his lower limbs.

COMPENSATION BETWEEN ATTACHMENT AND MUCOSA IN PARTIAL DENTURE CONSTRUCTION*

BY A. ALFRED NELSON, D.D.S., DETROIT MICH.

SCIENTIFIC PARTIAL DENTURE TECHNIC is and always has been, one of, if not the most interesting and vital branch of our profession, while at the same time it is one of the oldest. It is not my intention to discuss the whole field of this subject; rather the object is to adhere to the fundamental principles underlying this work, and the description of a method or means of construction in which these principles can be embodied.

Many men make the statement that they do not like to do this class of work. I believe that this is due to the fact that they follow no definite technic in methodical sequence, and because of this lack of system reap failure more often than success. The carrying out of a definite technic in methodical sequence has been the means of securing success in full denture work, and in direct ratio will secure the same satisfactory results in partial denture construction, provided, *"correct principals are embodied in that technic. Technic may vary in the hands of different individuals, under different conditions, but principals do not vary; they guide and control technic and hence are more important."*

The cardinal principle of this subject is a thorough knowledge of the behavior of tissues under denture-wearing stress. This is essential to a full appreciation and understanding of the work, and can best be gained by studying the underlying principles of full denture construction and observing the tissue changes that take place. For a further study of this subject I would refer you to the work that Dr. William A. Giffen, of Detroit, Mich., and Dr. M. M. House, of Indianapolis, Ind., are doing along the line of mouth and tissue classification and *the effects of denture-wearing stress upon various tissue conditions.*

The proper method of procedure in this work is to make a careful digital examination of the mouth cavity to determine the stability of the teeth *in situ*, and to detect the hard and soft areas upon which the proposed structure is to rest. A careful examination also is made to detect any inflammatory areas or sinuses on either the upper or lower arches, tongue, floor of the mouth, cheeks, soft palate, and the gingivæ of the teeth. If suspicious of infectious conditions, use every precaution

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*This paper was read before the Ohio State Dental Society, December, 1920, and is the first of a series of twelve articles on Partial Denture Construction, being written by the author specially for THE DENTAL SUMMARY.—*Ed.*

to protect yourself and future patients. The teeth should then be thoroughly prophylaxed. Radiographic examinations of all the teeth and edentulous spaces should then be made so that the patient's future health can be protected and insure success of the structure. Any attempt to construct a partial denture while the health of any tooth or root remains in doubt, is simply wasted effort, as that structure is bound to be a failure.

The next step most conducive to success in this field is to make preliminary impressions of each arch from which models or casts can be made. The occlusion should be registered with wax (bite), as this facilitates mounting the study casts on the articulator in their proper relation to one another. Yes! I most emphatically believe in the value of the mounted study model or cast, for if it is not mounted on an articulator it is not a study model.

These articulated casts are made for the purpose of studying and planning the fixture which should be done before proceeding with the case. This furnishes us with an opportunity of becoming familiar with the mental attitude of the patient and we can better estimate the difficulties to be overcome. It also demonstrates to the patient that you are giving the case careful consideration and helps to establish the confidence of that individual; that confidence which characterizes the operator as a man who knows what to do and why he does it. This is particularly helpful in those abnormal cases where it is necessary to resort to surgical interference in order to make a suitable foundation upon which the structure may rest. This may mean the removal of abnormally-placed teeth, reduction of spongy ridges of connective or mucous tissue which has been caused by the unequal resorption of the alveolar ridge, or the removal of portions of the ridge itself.

In the study of the case from the study casts and radiographic records, the following factors will guide you in determining the character and design of the fixture best indicated:

"Number of missing teeth and length of time they have been out.

"Extent of resorption and necessity of restoring facial contour.

"The occlusion of the remaining teeth.

"The number and position of the possible abutment teeth."

The summary of the above factors will govern the size of the proposed structure, which in turn governs the area of mucous tissue upon which the denture will rest and which must assume and sustain the burden of work. It always must be borne in mind that the principal function of the attachment on the abutment tooth is simply to retain or sustain the fixture, and not to do the work to which it is to be subjected; *i. e.*, to resist the stress of mastication.

Too much emphasis can not be placed upon the fact that the remaining natural teeth must be studied as regards stability and position so that the abutment teeth best suited may be selected. By abutment teeth

I mean those teeth on which the retaining attachment is placed. These teeth should be strong and firm and the tissues surrounding them should be healthy in order to insure permanency.

In speaking of abutment teeth it might seem that the discussion would be more pertinent under the subject of Crown and Bridgework rather than of Partial Denture Construction, yet with the ever increasing use of patented attachments by men who do not know their proper application, the dividing line between these two branches of our science is fast becoming obliterated entirely. This is due to a lack of understanding of the fundamental principles of each branch, with the result that failure is the inevitable reward.

For this reason I feel justified in making a brief reference to the nomenclature and definitions of the following:

PARTIAL DENTURES, FIXED BRIDGES AND REMOVABLE BRIDGES

Any structure which through necessity depends upon the mucous tissues and their underlying bony structure for support, is a partial denture and not a bridge, regardless of the material of which it is constructed. It must be so designed that it can be removed at will by the patient.

Any structure which is so fixed in the mouth that the abutment teeth bear the stress of mastication entirely, and cannot be removed at will by the patient, is a fixed bridge.

Any structure which depends upon the abutment teeth to bear the major burden of stress of mastication and so constructed that it can be removed at will, is a removable bridge.

In discussing this subject recently, Dr. J. K. Burgess made the following statement relative to removable work, and I am merely repeating it at this time because it contains food for thought: "Removable bridgework, requiring as many systems do almost universal pulp destruction in the field of operation and the extravagant waste of tooth tissue, is a travesty on surgery, the function of which is to conserve and not destroy. The excision of the tooth crowns and the reaming of the roots to mere shells for the placement of its retaining devices, not only has nothing in common with engineering, but tears down and weakens the foundation where engineering should maintain its integrity in the greatest possible degree and take every advantage of its inherent strength.

"In many instances the substitution of artificial teeth for the natural crowns in both fixed and removable bridgework is a distinct cosmetic loss, and the discoloration of the natural tooth following in the wake of pulp removal is frequently an esthetic calamity."

It is not my intention to discredit fixed and removable bridgework for I firmly believe that there is a place for each, that they frequently are indicated, and that fixed bridgework can be made sanitary to the extent that it can be cleaned in the mouth, and more or less permanent in nature, but that it must be so constructed that it affords the same opportunity for cleanliness as do the natural teeth. This one requirement of necessity limits the application of fixed structures to the replacement of but a few teeth in any given structure. The disregard of this one requirement has placed fixed bridgework in the low position which it now occupies.

In partial denture construction the abutment teeth in their relation to one another must be favorable to the correct mechanical fixation of the structure. This means that they should be as nearly opposite to each other as possible.

In selecting any type of attachment for a given case, please bear in mind that the soft tissues must assume the burden of work to be done by the denture, and that the attachment itself should act only as a retaining medium.

At the present time it is considered by the majority of well-informed and highly-trained men in our profession, that a properly-fitted clasp is the safest, sanest attachment that can be placed on a vital tooth.

At one time a critical and even skeptical profession assailed the use of clasps as a retaining medium. In its heyday many considered it as a fad of more or less transitory nature. Though many crimes have been charged to partial dentures, of which the poorly-constructed, ill-fitting and improperly-placed wrought clasp was directly guilty, yet, nevertheless, the men, yea, the very men who so strongly declaimed against the use of this attachment as a retaining medium, have been forced through necessity to return to the haven of partial dentures and clasps as attachments for large structures.

There were and are many reasons for the failure of wrought clasps as they are and were constructed and applied. One of the most prevalent causes is due to the fact, that in many instances partial dentures with clasps of wrought metal are made under the false premise that a resilient clasp will permit the denture to play and settle without materially straining the supporting teeth, the resilient clasp yielding each time stress is applied and permitting play. This property of resiliency is detrimental to tooth enamel, because each time there is a movement of the clasp on the tooth there is friction, and deterioration of tooth enamel ensues.

"The cast clasp has proved and continues to offer greater possibilities for the retention of partial dentures than the wrought or built-up clasp. There is however, one great objection to the cast clasp, namely, the roughness of its interior—that surface in contact with the enamel of the tooth, which is due to poor technic in casting. Unless a clasp can be made in such a manner as to be perfectly smooth on the inside it is fully as harmful, if not more so, than a wrought clasp. However, the elimination of this objection is merely a matter of improved technic, and this is being attained gradually by improved methods in casting."

As I stated, clasps were and still are guilty of many crimes when used as attachments for partial dentures, but guilty through omission or ignorance only if you will, in that they were and are incomplete. No provision has been made for compensation between the abutment teeth and the resiliency of the mucosa, the degree of which has not and cannot be determined. Heretofore the only faults were the loss of anatomical contour; the friction of the clasp upon the tooth and the compensating pull between the restoration and the abutment tooth, owing to the resiliency of the mucosa under masticatory stress. These faults as I have stated, have practically been eliminated since the advent of the casting technic and the perfection of materials of which to cast clasps.

This brings me to the theme of my paper, which, when "boiled down," is the utilization of the stem of the clasp as a means of compensation between the mucosa and abutment. For this purpose I use a long elastic wire stem which allows the clasps to remain stationary on the abutment teeth and at the same time compensating, through its springiness or elasticity, without pull when the restoration moves on mucosa under stress of mastication.

There is nothing new or original in this principle of compensation. It has been used for years in the form of the Campbell "Grasshopper" or "S"-shaped wire, and also as the "Weinstein semi-elliptical bent wire" attachment. This method is but a modification of these forms, but so modified that it limits to a great extent the objections of the former methods, *i.e.*, the crystallization of the stem and the subsequent breaking, as well as the bulkiness. To Dr. Wm. A. Giffen goes the credit of perfecting this means of compensation.

Having planned the structure from a careful survey of the mounted study models, we are ready to proceed with the construction of the denture. For convenience sake we will assume that the case under consideration is a lingual bar lower restoration involving the bicuspids and molars on both sides of the arch.

Individual "Complaster" impressions of the abutment teeth (cuspids in this case) are made in the "Roach Split Tray," for the purpose. The impressions are then coated with an isolating and filler solution and poured in Weinstein's "Cast Clasp Investment." When set the models are readily separated from the impressions by placing in a pan of water and bringing to a boil; the models are allowed to dry and the desired shape wax pattern of the clasps are made on the models of casting wax. Sprue wires of 16- or 18-gauge are attached and the model, soaked in water and then invested in "cast clasp investment."

"This investment being of the high-plaster type the 'boiling out' instead of the 'burning out' process of removing the pattern must be employed to secure best results. After the investment has set from thirty to forty-five minutes—preferably one hour, the crucible former is removed, and the mold or casting ring laid on its side in a pan of boiling water and kept there for at least five minutes until it is evident that the wax has come out. There should be sufficient water in the pan so that the mold is well submerged, and the water must be not only boiling when the operation is started, but must be kept boiling. To raise the temperature of the water for this purpose add a small quanity of salt or sulphuric acid. The boiling process removes the entire pattern with the exception of a slight film of wax which adheres to the walls of the pattern chamber and which is decarbonized upon drying. As there is practically no wax present in the mold, the drying process may be done at a lower temperature than usually is the case. It must be done at a low temperature as the investment containing a high percentage of plaster, must not be subjected to an excessive temperature. Four hundred degrees F. for a period of thirty-five to forty-five minutes is sufficient". This method of removing the wax offers great possibilities and I do not hesitate to recommend it for inlay and other small castings as well as cast clasps. I have used it for a long time in large castings, but it was not until Dr. Weinstein brought it to my attention as a factor in small castings that I really appreciated its merit. I have obtained better results with this method than I have with any other and I have tried a good many of them.

When the mold has been heated for the stated period at the proper temperature it is immediately placed on the machine and the pattern cast of "Neyoro F" cast clasp material. I think a word of caution at this time is not amiss relative to cast clasp alloys. These alloys in the cast form are rigid rather than resilient, and therefore the same degree of springiness must not be expected from cast clasps as from wrought clasps. In those cases where the clasps are to be forced open to spring over bell-shaped teeth, they should be broad and thin rather than thick and narrow. For extremely bell-shaped teeth, wrought clasps should be used or none at all, and while I do not favor a wrought clasp, yet there are occasions when we must resort to them. I have found that Neyoro "Elastic" Gold in either plate or wire form is the best material for this purpose, and I would recommend Dr. Cummer's technic for those cases.

When the clasps are completed they are placed on their respective teeth in the mouth.

As an accurate impression of all detail is absolutely essential for the basic construction of this work, an impression in either plaster of Paris or complaster is made in a suitable tray. When set the impression is removed in sections (or *en masse* if possible) and assembled. The clasps are placed in their respective positions in the impression. An impression of the opposing jaw is made and the occlusion registered in wax. (Bite).

When sufficiently dry the plaster impressions are coated with the isolating and filler solution and again allowed to dry. They are then immersed in water and the surplus removed, when they are poured in artificial stone. The impressions are poured in stone for the reason that it is a well-known fact that the working models upon which a structure is built has its influence for success or failure upon the finished product, and therefore we must demand a non-contracting, non-expanding, hard cast, one that also will withstand the effects of pressure, heat and moisture. When the casts are separated they are mounted on an anatomical articulator.

The question of proper relief of certain areas has been neglected in the study of this subject and it is one that should be given a great deal of attention. We must make relief for the lingual bar so that it will lie in proper relationship to the lingual tissues and to provide for this a piece of adhesive tape or surgeon's tape is placed over that portion of the lower model against which the lingual bar is to rest.

At the opening of my paper, I stated that I believed in carrying out a definite technic in methodical sequence. This I do both in the telling and doing of it and I trust you will bear with me if I seemingly deviate from the subject, which I am not doing, because what I am about to say I believe to be of utmost importance; it is of very recent origin and has a distinct bearing upon our work.

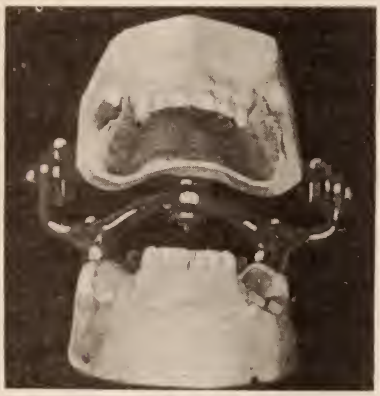

Fig. 1

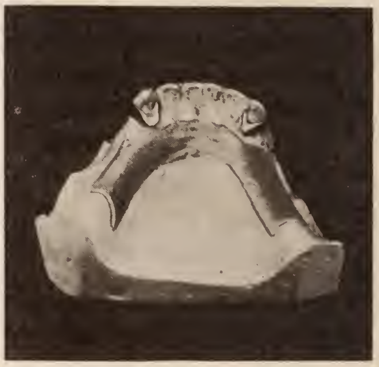

Fig. 2

Fig. 1—Study cast or models mounted on articulator.
Fig. 2—Stone cast or model with clasps and adhesive tape in position.

I think that I am within the bounds of my subject if I bring to your attention the necessity of heat-treating the alloys with which we are working. "Heat treatment is divided into two phases, annealing alloys to make them softer as in the case of wires, plate, etc., and the other tempering (whether cast or wrought) to make them harder, stronger, and more resistant to stress. Elastic wires and plates, and in fact all dental wrought golds should be annealed prior to any manipulation, by heating to a cherry red as uniformly as possible and plunging into water, and they should be re-annealed frequently during manipulation." The second phase of heat treatment will be taken up in its proper sequence in the construction of this case.

A sixteen-gauge piece of "Neyoro Elastic Wire," which has previously been ovalled in the mills, is annealed and bent to the proper shape and of the proper length to connect the two clasps to the proposed lingual bar, taking care that the wire does not impinge upon the gingivæ of the teeth. The wire and clasps are attached with sticky wax and carefully removed, invested and soldered and then returned to the model. Coat the adhesive tape with "K. Y. Lubricating Jelly" and then press two thicknesses of "Kerr's No. 26-gauge Casting Wax Sheets" or one thickness of pink base-plate wax to place, and trim to the desired shape, conforming the upper edge of the wax lingual bar to the elastic wire running from the clasps. This wax lingual bar is removed carefully and sprue wires attached, invested and cast of any good, stiff, denture casting gold. The same technic for investing and casting as was followed in casting the clasps is used.

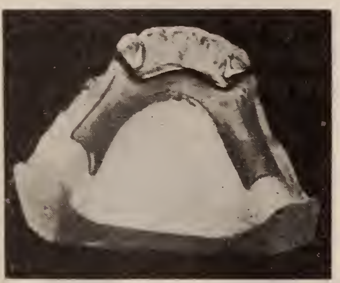

Fig. 3

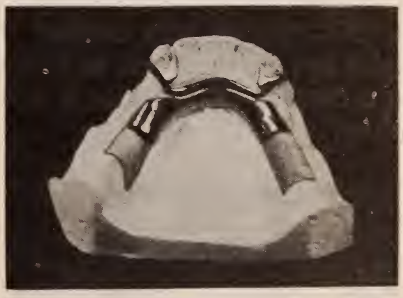

Fig. 4

Fig. 3—"Neyoro 16-gauge Elastic Wire" in position connecting the two clasps.
Fig. 4—Wax lingual bar pressed to place and trimmed, before investing.

When cast, the lingual bar is trimmed and polished smooth, and lugs soldered at the terminals to engage into the vulcanite saddles. Replace the bar on the model and attach the clasp stem with sticky wax. Remove the clasps, stem and bar and invest. Solder the stem to the bar in the center only, and then replace the invested case back on the fire for the second phase of heat treatment or the tempering process.

"The case is heated to almost cherry red, (provided no low-grade solders are present) and it is permitted to remain at that temperature for from ten to fifteen minutes. The flame is then gradually reduced and finally turned off, and the work permitted to remain until quite cool. This treatment makes the entire appliance not only more homogeneous through proper molecular re-arrangement, but actually increases the hardness, tensile strength and resiliency to such an extent as to be distinctly measurable and highly valuable."

When tempered, trim and polish smooth and return to model and set up the teeth required for the case, and if desired the patient can be called in for a "tryin."

The selection and arrangement of the teeth is also of the utmost importance, and it is well at this time to call attention to one of the greatest "bug-bears" in denture construction, *i. e.*, the dislodging of the lower denture. In a large percentage of cases the lower molars are lost long before the patient begins to wear partial dentures. The tongue having nothing to confine it laterally, becomes wider in this region, so that when molars as wide bucco-lingually as the natural molars were, are placed in a lower partial or full denture, there is not enough room for the tongue. If molars, say, about a millimeter narrower than the natural molars were used, it would greatly increase the efficiency of the dentures. By using Trubyte Mould No. 32 L. bicuspids, and Mould No. 28 L. molars, very efficient dentures can be constructed. The bicuspids and molars should be so arranged that when the stress of mastication is applied to the ridge it will not have a tendency to dislodge the denture.

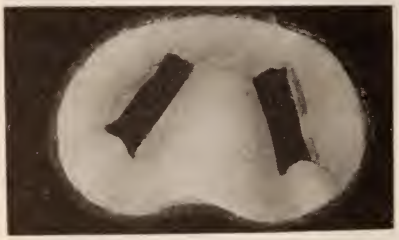

Fig. 5

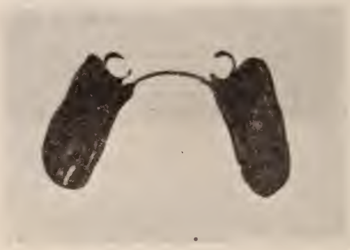

Fig. 6

Fig. 5—Ash & Son's No. 7 Soft Metal in place over model for first vulcanization.
Fig. 6—Compound in place for muscle-trimmed impression.

When the restoration includes the four or six anterior teeth, especially the uppers, they should be selected according to the Trubyte or Typal system so that harmony will be insured, and they should be so arranged as to preserve the characteristic expression of the patient. The highest esthetic effects are gained by grinding and staining the teeth.

When the case has been corrected in the mouth and waxed properly, it is flasked, packed and vulcanized. In the packing of the case, burnish a sheet of Ash and Son's "No. 7 Soft Metal" over the model. The removal of this metal after vulcanization, provides a space for the use of compound in taking an impression of the mucosa and underlying structures, which must carry the burden of stress of mastication.

The case is taken from the vulcanizer and polished; the patient called in and tried in the mouth. If there is no impingement any place, the base or saddle portion from which the "No. 7 Soft Metal" was stripped, is lined with compound and a closed-mouth muscle-trimmed impression made. When the impression is completed the usual procedure of rebasing is carried out.

All partial dentures should be made of vulcanite so that the settlement which invariably takes place can be corrected from time to time. A metal partial denture should not be made for a case of recent extraction, and should only be constructed after the patient has worn a vulcanite one for some time, until such time at least, as the settlement is negligible in a given period of time, and those cases are so rare as seldom to exist.

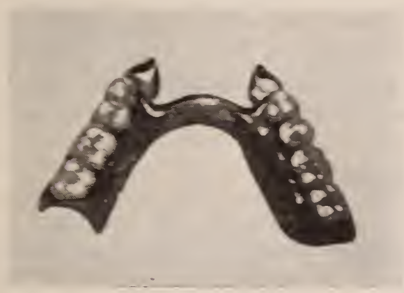

Fig. 7—Completed case.

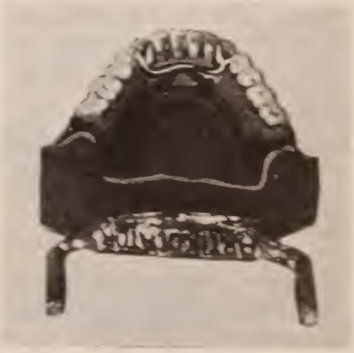

Fig. 8—Technic case on technic model.

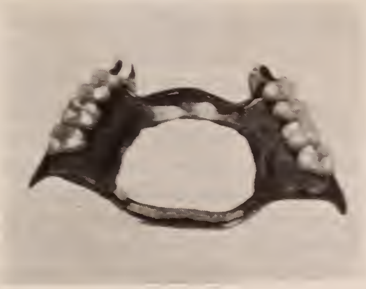

Fig. 9—Case constructed for upper arch, using same principle.

In order to obtain the highest degree of efficiency it is necessary to grind the teeth to precision, in order to remove the inaccuracies that creep in during the process of vulcanization. When completed the case should be worn by the patient at least twenty-four hours before attempting to correct the occlusion with the aid of stones and emery powder.

In summarizing, partial dentures are, like any other dental operation, a series of patchwork, and at best only temporary. In order to make them more permanent, attention must be given to periodic rebasing so that the mucosa always will carry the burden of the stress of mastication. "When the abutment teeth receive the major stress due to lack of rebasing, the denture becomes a removable bridge and as this, fails."

"The success of partial dentures depends entirely upon the employment of correct mechanical principles throughout their conception and subsequent application. Their permanency and usefulness will increase in proportion as the mechanics involved are correctly applied."

I desire to take advantage of this opportunity to express my deep appreciation to Dr. Louis J. Weinstein, of New York City, who assisted me materially in this work and allowed me free rein in the use of any and all of his works, as well as to Dr. William A. Giffen, of Detroit, Michigan, who has labored patiently trying to inculcate into my mind a few of the fundamentals relative to this branch of our profession. I also wish to acknowledge my indebtedness to Drs. H. J. Goslee and F. E. Roach, of Chicago, Ill., J. K. Burgess, of New York City, and P. C. Lowery, of Detroit, Michigan, for pertinent thoughts, and quotations from their writings and lectures, which I have incorporated in this paper.

QUESTIONNAIRE

QUESTION: Will you please give the technic for "boiling out" the wax again?

DR. NELSON: After the investment has set about forty-five minutes—the crucible former is removed, and the mold or casting ring laid on its side in a pan of boiling water and kept there for at least five minutes, until it is evident that the wax has come out. There should be sufficient water in the pan so that the mold is well submerged and the water must not only be boiling when the operation is started, but must be kept boiling. To raise the temperature of the water for this purpose add a small quantity of salt, bicarbonate of soda, or sulphuric acid.

QUESTION: What effect would some chemical have in dissolving the wax?

DR. NELSON: While it is true that soda, salt or sulphuric acid will increase the temperature of the boiling water, it possibly may shorten the time required to generate sufficient steam to soften and force out the wax, and is used only for that purpose, however, I do not believe that either of the above used cautiously will have any deleterious effect upon either the mold or would assist in dissolving the wax.

QUESTION: In "boiling out" the wax do you use any other investment except "Weinstein's Cast Clasp Investment?"

DR. NELSON: No. My best results have been obtained with this investment, although there are other cast "clasp investments" that can be used for this purpose, as they all have a high plaster content.

QUESTION: Can a cast clasp be successfully made on a metal model, like amalgam?

DR. NELSON: Yes. Especially if the tooth does not happen to be bell shaped, which adds to the difficulty of removing the pattern. I think however, that in the hands of the average man, casting direct on the model is a simpler technic, and the average of success will be much higher for the reason that few men develop technical skill so they can reproduce in an amalgam model with the same accuracy and arrangement of the teeth to be clasped, as they are on their original model.

QUESTION: Do you paint your wax on the model or use sheet wax?

DR. NELSON: I use 18-gauge sheet wax made by doubling two thicknesses of "Kerr's No. 26 Gauge Casting Wax Sheets." This gauge is thick enough to allow for restoring anatomical contour on the outside of the clasp and for loss in polishing.

QUESTION: What do you use to paint the "Complaster" impression with?

DR. NELSON: Grain alcohol solution of sandarac.

QUESTION: How do you keep a Maves Heater down to 400 degrees F.?

Dr. Nelson: In order to control heat in any heater it is necessary to equip it with a rheostat and pyrometer. A large size oven is the best to buy as it can be used and controlled as well as a small oven and can be utilized for a number of purposes.

Question: At the insertion of the denture, what are the deciding factors in absorption or shrinkage of tissues?

Dr. Nelson: Applied force exerted upon the tissues upon which the structure rests. On most ridges there is less tissue on the crest of the ridge than there is on the buccal, labial and lingual aspects. When stress is applied the restoration first dislodges any soft tissue that may be on the crest of the ridge, and the lateral motion soon displaces the soft tissues on the labial, buccal and lingual aspects so there is an unequal foundation for the structure to rest upon, and the constant irritation set up causes destructive cell activity which results in resorption, and this accounts for the loss of occlusion in a large majority of cases, a short time after the first insertion of a partial denture.

Question: To what do you attribute your lack of fit in your denture in the first vulcanization?

Dr. Nelson: The fact that the impression has been taken with plaster of Paris precludes the possibility of equalizing the stress of mastication upon those tissues. In other words, the resiliency of the soft tissues is not interfered with in the act of taking an impression with plaster of Paris. All partials must have an equalized bearing upon their foundation when the stress of mastication is placed upon them in the position of central occlusion, the same as in full dentures.

Question: Do you find it necessary to rebase all these cases?

Dr. Nelson: Yes. Partial dentures should be constructed with this principle in view, and further, they should be rebased at any future period when occlusion is lost.

Question: Does this just apply to partials?

Dr. Nelson: All dentures require rebasing owing to the constant tissue changes which take place under denture-wearing stress, and over which we have no control. Partials require rebasing more often than full dentures for the reason that the occlusion is interfered with, due to the fact that the artificial portion of the restoration settles, whereas the natural teeth do not.

Question: Will you give us the technic for relining or rebasing the denture?

Dr. Nelson: Place a wafer of "Perfection Compound" over the saddle portion of the denture. Soften it in the ridge portion and insert in the patient's mouth and instruct her to bite down. Get it seated first under stress and chill in position. Remove and heat the heel portion on the right side and reinsert in the mouth, and muscle-trim as with an ordinary full denture, taking only one step at a time. Have the patient go through the contortions Dr. Campbell kidded us about yesterday. Too many men fail because they try to handle modeling compound like plaster of Paris. You can not do it and get results. After having muscle-trimmed all around, trace a layer or bead of "black carding wax" around the periphery of the saddles and insert in the mouth and have the patient bite down. This displaces the tissues or compresses them along the buccal, labial and lingual aspects of the ridge, and uniform pressure is exerted upon it when stress is applied. Remove from the mouth and flask it upside down in the lower half of the flask. Consider the compound as wax. Pour the upper half of the flask, separate, and pack in "Ash & Son's Dark Elastic Rubber" and vulcanize.

Question: What is the advantage of modeling compound over wax in taking this impression?

Dr. Nelson: On account of the low fusing qualities of wax, it cannot be controlled as well as compound, although there is no objection to using black carding wax to correct or improve a "valve seal" around the periphery.

Question: Do you ever allow the patient to wear the denture with the metal in place for twenty-four to forty-eight hours before rebasing them?

Dr. Nelson: No. I remove the tin immediately, and rebase with compound and let the patient wear this for a few days and correct it by adding more compound until they are perfectly seated with no interference in the occlusion. When that is satisfactory, replace the compound with vulcanite.

Question: Do you find that the cast clasps sometimes become loosened after wearing a certain number of times?

Dr. Nelson: No. That has not been my experience with cast clasps.

609 Washington Arcade.

ALL ABOUT ANIMALS—AND "HUMANS"

The Darwinian theory of our origin is often the topic of considerable debate. Whether or not we "humans" are descended from the ape does not worry us greatly. One thing we are quite sure of is that we all possess a sense of humor. We enjoy the witty writings about "humans" and animals and whatnot, screened in theatres throughout America in "Topics of the Day" films. Just to prove our contention that a sense of humor is found in all people—even as you and I—The Summary presents some selections of witty wordings all about animals and "humans:"

Out in Kansas a Mrs. Monkey at the zoo has given birth to a little monkey. And the little devil is so thin they've named it Georgette.—*Ithica, (N. Y.) Journal.*

"A San Francisco man brought suit for divorce, objecting to his wife bringing a pet lion to bed with her." Gee! Some husbands are certainly finicky!—*Helena, (Montana) Independent.*

About the only advantage a horse has is that he doesn't have to take off his shoes when he goes to bed.—*Galveston News.*

A horse bit the rear tire of our neighbor's auto and blew out his teeth.—*Edmonton, (Canada) Journal.*

Walter Little, our well known fellow-townsman, was picking blackberries last week and was badly gassed by a skunk.—*Arkansas Thomas Cat.*

The chief aim of every alligator's life is to become a satchel.—*Border Cities, (Ontario) Star.*

"Look, mother," cried Willie, pointing to the elephant, "He's bigger than h--l, ain't he?" "Willie!! How many times must I tell you never to say Ain't?"—*Boston Transcript.*

Circus manager: "So you want a job, do you? What steps would you take if a lion were to escape?" "Good long ones, guv'nor!"—*Edinburgh Scotsman.*

DENTURE CONSTRUCTION*

BY DAYTON DUNBAR CAMPBELL, D.D.S., KANSAS CITY, MO.

IT IS WITH NO LITTLE PLEASURE that I come here to address you men of Ohio. My mother was born in Marietta, Ohio, and the one man who has been the most potent factor in my professional growth lives in the State of Ohio; and if some time in the future I may receive the emoluments of the profession as he has received them, if I may in some small way fill a part of the niche in the profession that this man has filled, I shall feel then that I have received my professional reward. I refer to my prosthetic preceptor, Dr. George Henry Wilson. (Applause).

Your committee has given me the subject, "Denture Construction," which affords great latitude. I shall begin by presenting one phase of denture construction which must be reckoned with before the teeth are taken from the mouth. It has been said that you may pull teeth, you may extract teeth, or you may surgically remove them. I am very much in favor of the last procedure, an operation known as alveolectomy, and I will show you why.

The first slide is of an edentulous jaw. You will note that the X-ray shows the fine spicules that stick up and give you so much trouble after you have made a denture which you think should give service. The patient cannot put pressure upon it, and it is worthless to him so far as service is concerned. In treating this case the gum was laid back, and the muco-periosteum stripped back free, and with a curette and scraper these spicules were cut away and dressed down, so that when the gum was brought back into position healing by first intention took place, and we were able to provide the patient with a serviceable denture.

Recently my associate performed this operation for a lady sixty-five years old, and besides taking off all of these spicules found two small roots. Neither roots nor spicules had been disclosed by the X-ray.

Others of these pictures show other phases. Be sure to employ this operation, especially in the case of a patient who has tried to wear dentures and has white ulcerated patches surrounded by dull red tissue, and you seem unable to cope with it. You will find that in every instance where this condition is removed surgically you will not have further trouble.

In this connection I want to emphasize the words of our National secretary, Dr. Otto U. King, with reference to your buying the Christmas stamps for the Dentists' Relief Fund. As I use them, the intrinsic value of the stamps far exceeds one dollar. The point of irritation on the gum tissue is noted; a piece of one of these stamps about two millimeters square is moistened and placed printed side down upon the sore spot. The denture is thoroughly dried and inserted, pressed to place firmly and removed with the piece of stamp adhering where the base is to be corrected.

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*An illustrated lecture given before the Ohio State Dental Society, December 1920,

When the patient presents himself with all of his teeth, it is a good plan to take impressions of those teeth so that we may have them aligned properly in a cast. We may then reproduce them if we wish; they will at least enable us to approximate their naturalness when we construct the artificial denture. We use Kerr's Modeling Compound, and let it get almost cold; then re-warm it and coat with a thin film of vaseline or surgeon's jelly, and after holding over the flame for a moment, take an impression of these teeth but do not extend over the necks of the teeth. In this way we can set the teeth back in their proper relations, since the compound is not distorted; we then build it up with wax to proper contour and pour with plaster. (*Fig. 1*).

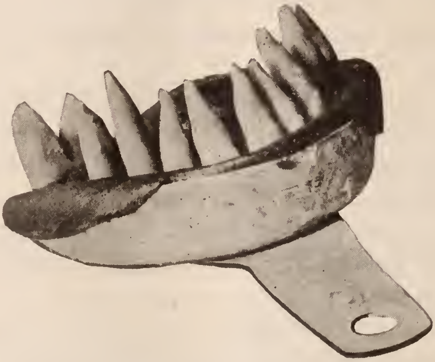


Fig. 1—Patient's natural teeth placed in modeling compound impression which was taken before teeth were removed.

Fig. 2 shows the operation designed by Dr. W. L. Shearer, of Omaha; here the teeth have been removed and with a periosteal elevator going in between the process and the periosteum, the muco-periosteum is being stripped back. Do not be afraid to strip the periosteum back. Get plenty of room there in which to work.

Fig. 3. The condition after cutting away the buccal and labial plates with the Ronguer forcep. When these are taken away and the flap drawn down, if you wish, you may stitch it. I prefer, however, not to stitch. I do not believe it is needed, because the tongue against the roof of the mouth and the pressure of the lips will bring the flaps together, so there is no need of stitching.

After the operation, and after the scallop of gum tissue has been cut away with the scissors, the tissues are brought together until they nearly approximate. The roll of modeling compound is placed on a metal tray and warmed, placed in the mouth and pressed up to position;

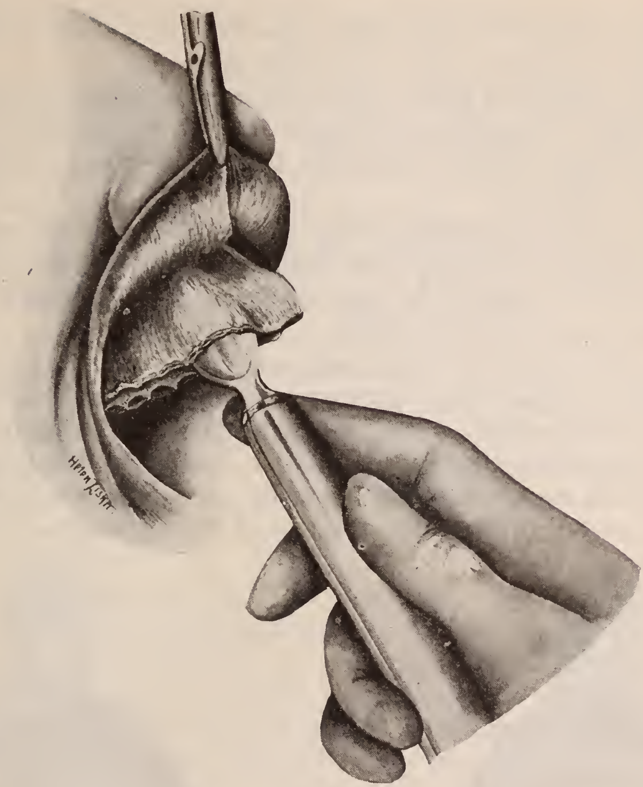


Fig. 2— This illustration shows the case with teeth extracted, and the muco-periosteum being stripped back.

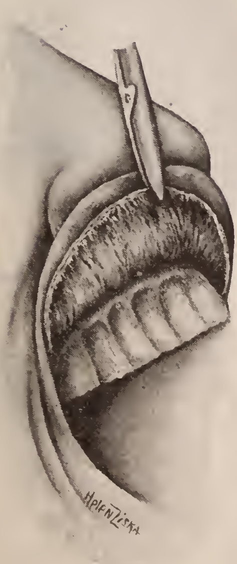


Fig. 3

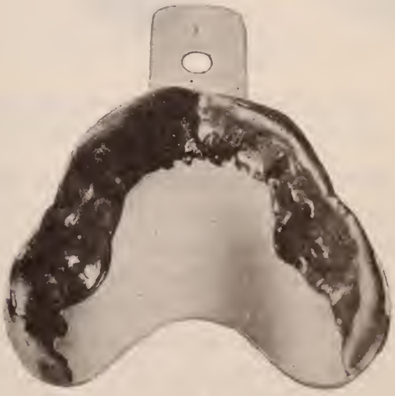


Fig. 4

Fig. 3—Condition after removal of the buccal and labial plates and after curettement of the diseased alveoli.

Fig. 4—Impression of bucco-labial portion.

the pressure pushes the tissue down upon the crest of the border of the ridge, where it should be; the tray is then removed.

In every instance in which there is an impression of the tooth socket, we cut it away. It should never be left. If we cut them out it will allow the smooth base to form a blood clot here which will give form to the tissues later. (*Fig. 4*).

Fig. 5. A cone of modeling compound is placed in the central portion of the tray. This presses the tissue into position, and as the compound flows down toward the crest of the ridge, it will press that gum flap toward the crest of the ridge.

Fig. 6. Do not mind if the compound does not always come together. This is taken into the laboratory and poured by the assistant with cast plaster while we are taking the lower. The lower differs in that the lingual flange is formed first, *i. e.*, before the labial and buccal flanges, for the reason that it more easily assumes a more correct position while we are constructing the rest of the impression.

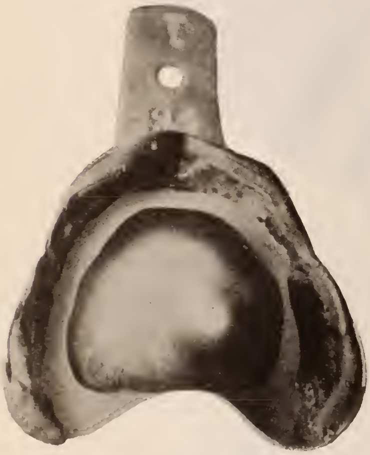


Fig. 5

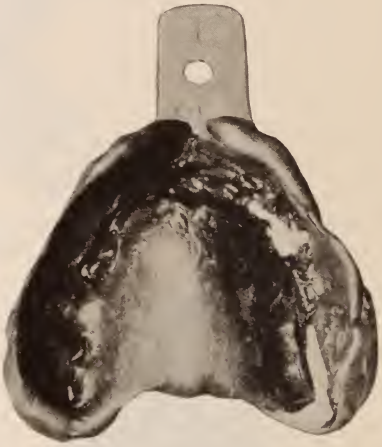


Fig. 6

Fig. 5—Cone shaped mass of modeling compound ready for palatal impression.
Fig. 6—Upper after impressions of tooth sockets have been cut out.

After constructing the two bases of suitable material, modeling compound is placed on the lower, is chilled, then the occlusal portion is warmed and the patient allowed to bite into it with the upper. The excess is cut away, and the patient wears them home. They have great psychological value. Patients immediately begin to learn how to wear dentures. Their mouths are rested, and when they come back for their next dentures which are better fitting, they get the desired effect. This phase is treated at length in THE DENTAL SUMMARY for January, 1920.

In impression taking I select the factors that make for simplicity and speed and strength. I believe the exponents of modeling compound can take as good impressions as I can take. Dr. Wilson can take a tray and a piece of beeswax and take as good impressions as any body can take.

For my part I prefer a combination of three methods, the Hall, the Green and the Wilson, and out of these three I employ phases which I think are not only the most helpful but also the most teachable. We know one of the greatest factors in the retention of dentures is the area covered; next, and of almost equal importance, is peripheral adaptation; then follows extension on to the soft tissues, and finally, leverage. The following is our method: We place S. S. White Impression Tray Compound in a suitable tray and take a good impression.

The black tray material is removed from the Britannia metal tray. It is then trimmed with a very sharp knife—the knife should be very sharp. If the knife is dull you may break the compound. Trim it along the border just at the crest where the border starts to turn over. Before taking the lower, we flatten a piece of 14-gauge soft iron wire and contour it to fit the tray; it should be extended well toward the heels so that the black compound tray will be strengthened in the posterior portions especially.

By tracing Kerr's Stick Compound upon the black compound it will warm the black compound beneath it, and through proper manipulation of the cheeks will give us the proper height of the improvised tray. Notice this hole in the tray. In Denver two years ago I met Dr. Hall and he said, "How are you taking impressions now?" I told him, and when I was almost to the point of saying that I drilled a hole in the center of the tray he asked, "Do you drill a hole?" I said, "Yes, and I noticed recently an article by Dr. Frahm, of Los Angeles, in which he says he too is using this hole." When I came back to Kansas City, I met the man who patented the hole in that tray seven years ago, Dr. Leslie E. Eaton, of Hot Springs, South Dakota, the designer of the celluloid impression tray put out by the Caulk Dental Mfg. Co. This is interesting as bearing upon these questions of priority which we so often hear raised; may I add, in my opinion, claims to priority rank with the hollowest of hollow honors.

My purpose in putting this hole in the tray is not primarily to let the plaster out. It is placed there so that when I put it in the patient's mouth the tray *would not* stay in place. In taking modeling compound impressions as you have been taught—and these men take beautiful impressions—they, I believe, massage the tissues around the peripheral border; they get a strong peripheral adaptation, and get a valve seal there without leak as taught by Dr. Green, and the result, I believe, is that they get in that impression a very shallow vacuum chamber over a great area; but it has a tremendous pulling power and consequently when the impression is pressed firmly into place it has a tendency to hang tight. The modeling compound enthusiast places it in position, shoves it up, and has the patient engage in some seven different muscular activities such as coughing, gagging, whistling, etc.

The patient in the chair says to himself, "I have come to a pretty good dentist. I never had a plate do that before. I can't get it down at all." I know and you know, that this is the wrong attitude on the part of the dentist. The patient and the dentist have a little game entitled "dislodging the impression," and the dentist with his thumbs in the armholes of his vest struts about wearing the smile that won't come off—for a week or ten days. He wins this game. The case is reproduced in the vulcanite and the patient wears the denture home in good shape. But in seven or ten days when the tissues of the mouth have come down and have filled this vacuum, as they inevitably do in response to the laws of atmospheric pressure, the patient returns, opens the door and says, "See here, Doctor!" (Laughter). Modeling compound impressions can doubtless be taken, and taken all right, but for the novice the better plan is the one I am giving you. This vacuum does not exist when we have a hole in the tray and use plaster for the final portion of impression.

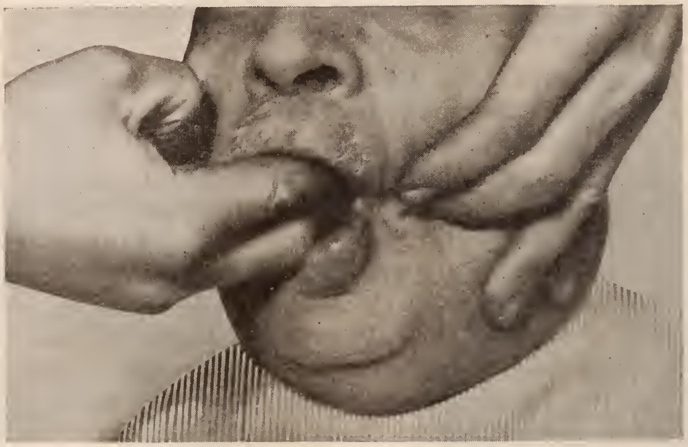


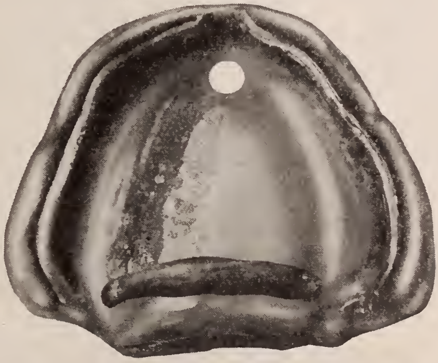
Fig. 7—In trimming the border with the use of Kerr's Modeling Compound, two fingers of the left hand may be employed, pressing down and inward from the outside.

I do not encourage the patient to go through any facial gymnastics. You will find it easy to manipulate the lips and cheeks with the thumb and fingers, thus disposing of superfluous compound.

Care should be exercised in manipulating the compound while in the mouth. The tissue overlying the compound should be straightened out by lifting and pulling downward; then it is pressed inward as shown in *Fig. 7.* In times past, some made a practice of scraping the cast to secure the adaptation which we secure by this method. That is unscientific. Experts in the use of modeling compound know exactly the right temperature at which to use it during their massaging operations, so that when the impression is returned to the mouth there is no undue pressure upon the hard areas and still there is sufficient pressure upon the soft tissues. I am not sufficiently expert to do that. I take black carding wax and after running it through a wax-sprue gun, use the approximately 12-gauge wax wire thus obtained.

We take the black compound impression tray, and place a strand of carding wax along the inner border along a line corresponding to the line on the cast which older practitioners were accustomed to scrape. The most successful among these scrapers was the best guesser. With this wax wire sealed in position, place the tray in cold water, then place it in the patient's mouth and hold it about a minute—it is best to time this operation with your watch—a minute or a minute and a half. Gradually the heat of the mouth warms this carding wax wire, and gradually the wire flattens out and compresses those parts that are compressible, and it is too soft to compress the parts that do not need compressing. Near the end of this operation the dentist with his fingers upon the base is exerting at least twenty-five pounds pressure. Along the posterior part of the impression tray we roll up a piece about the size of a slate pencil and lay it across from tuberosity to tuberosity. (*Fig. 8*). The lower is not treated in this manner.

Fig. 8—Roll of "card" wax in place ready to be inserted for purpose of securing compression of the tissues.



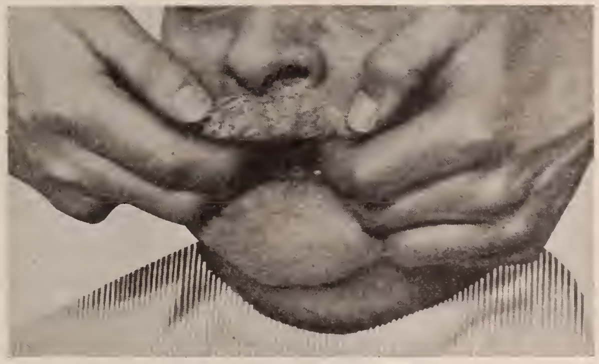


Fig. 9—In taking the plaster impression, the operator uses the two fingers of each hand upon the base of the tray to exert pressure upward and backward in a line with the ears.

In exerting this pressure the dentist will stand immediately behind the patient, employing the two fingers of each hand on the base of the tray to exert pressure upward and backward in a line with the ears. This position and method of applying the pressure is also employed when taking the plaster impression. (*Fig. 9*).

The advantages to be secured through post-damming are among the most effective factors in the retention of a denture, and they are also some of the most difficult results to get. You will keep in mind the juncture of the hard and soft palates, and place, as we have shown, this roll of carding wax along the posterior portion of the black tray in a position corresponding to their juncture. Bring this tray supplied with carding wax up to place, and by exerting the pressure as mentioned the carding wax acts automatically, compressing the soft tissues slightly, while the hard palate is not compressed but instead acts as a governor and prevents over-compression at this point.

QUESTION: Why does your plate drop after seven or ten days?

DR. CAMPBELL: Mine do not. I referred to dentures constructed after the modeling compound impression technic in the hands of those who are not experts.

QUESTION: Why do those you have reference to drop?

DR. CAMPBELL: I do not say that they all do, but I know it has been my experience in times past that some have, because they create an abnormal vacuum. Nature abhors a vacuum, and seven days usually is sufficient for a response to the laws of atmospheric pressure which require that something fill the vacuum; the tissue fills it; the denture has been held in position by atmospheric pressure and when that which held it is removed I see nothing to keep it from falling.

In taking the upper plaster impression, with a knife cut away the whole inner palatal surface of the black tray compound up to the border made by placing the carding wax. This hole in the tray assists the plaster to escape. In mixing plaster, I use a water bottle in which I have dissolved two tablespoonfuls of potassium sulphate, and it is kept at room temperature all the time. Use a good grade of cast plaster, mix it with this water containing potassium sulphate, and as soon as it reaches the proper consistency (rather thin) place it in the tray and bring it up into position in the patient's mouth, using considerable pressure after it is in position and before it sets. When the plaster is hardened, use a syringe to force water all around the border of the tray, and it will come down readily. If the impression sticks, and you have difficulty in dislodging it, apologize for it, and say, "I wish I could make a denture that would stay in place like that." Owing to the affinity of water for plaster the moisture of the mouth has not been sufficient to prevent the formation of millions of small vacuum cups, and that is the reason it sticks, and so we put the water in there to fill the multiple of myriads of minute vacuums. Then the impression comes out readily and easily.

QUESTION: You post-dam the black compound impression tray after you cut the hole?

DR. CAMPBELL: Yes.

QUESTION: What is the patient's position as you take this impression?

DR. CAMPBELL: The patient is leaning forward slightly with elbows resting on his knees. Just before I place the plaster in the patient's mouth, I say, "If you have a tendency to gag do not be afraid of spoiling the impression because it will not." In fact I suggest that the patient emit a gutteral sound which usually is associated with clearing the throat. I now place the improvised tray filled with soft plaster in the mouth. With the patient in this position the plaster will run out of his mouth instead of down his throat. I use a goodly amount of plaster. Some of my friends joke with me about the amount I use. Perhaps some operators would not find it necessary or helpful to have the patient assume this position.

(Concluded in next issue of THE DENTAL SUMMARY)

Indiana State

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THE COMMERCIAL INTERPRETATION OF X-RAY FILMS*

BY L. E. CUSTER, A.M., D.D.S., DAYTON, OHIO

JUST TWENTY-FIVE YEARS AGO last month Roentgen discovered the X-ray. It was classical and always will stand out as one of the most startling discoveries of the last century. The benefits that have accrued to mankind from its use are beyond adequate description. But like many other things, its development and its almost sacred use upon the human being have in late years assumed such a debasing commercialism that it is time to pause for a moment. X-ray laboratories are to be found on every hand. Men and women without either medical or dental training are operating them and vouchsafing interpretations and diagnoses that are mystifying and wide of the mark. These operators, instead of confining themselves to the pure photography of the X-ray and referring the case to the physician or dentist, are taking upon themselves the interpretation of the shadows and as a rule, in order to impress upon the patient the worth of the X-ray in the case, accompany the picture with a wealth of words and meaningless conclusions, that to one standing behind the screen it has become what could be a huge joke, were it not often a tragedy.

The writer was one of the very first (Dr. Edward Kells being first) to establish the X-ray in dental practice. In its early days the writer was also in charge of the work at the Miami Valley Hospital, so that I come before you with a long experience in both dental and hospital work. Some minor improvements in the early development of X-ray technic are credited to me. These things are not said boastfully, but that you may understand the basis for my grievance and my desire to lift X-ray interpretation out of the commercialism into which it has drifted.

The X-ray was born in mystery and X—the unknown—clings to it to this day. But the clarification of its mysteries and the invention and adaptation of instruments for its development and use have been going on with surprising uniformity. But with all that, the technic has not yet become so simple as to be fool-proof. The expense of an outfit has rather been on the increase as the refinements have been added. The study and experimental work that one must engage in if he would install an outfit are still considerable. But fortunate is the man doing so today as compared with the troubles of the pioneer who had to deal with the mysterious X-ray burn.

Long ago it became apparent that every dentist should have the benefits of the X-ray. If he had no outfit of his own, he should have access to one. So that as a natural outcome there has grown up in our midst the X-ray laboratory, itself a splendid and economical addition. But as previously hinted at, the professional radiographer has at the same time overstepped his bounds. Instead of confining himself to X-ray photography, he overreaches into the field that strictly belongs to the dentist or physician.

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*Read before the Ohio State Dental Society, December, 1920.

No radiograph and especially no dental film, can be fully and properly interpreted unless the past history of the patient is taken in conjunction with the examination of the film, and the professional radiographer can not properly do this. The interpretation of a dental radiograph is not as simple as the novice would have you believe. A young Boston dentist even appeared before the last National Dental Association, completely reversed as to the appearance of the peridental membrane.

To make a correct interpretation and diagnosis the dentist must first become familiar with the appearance of normal dental tissues. In normal tissue there is a close similarity which prevails so uniformly that mistaken diagnosis are not often made, yet we find an occasional mistake due largely to want of experience. As illustrations of the confusion in healthy tissues whose outlines are somewhat variable, the position of the mental foramen and the size and shape of the antrum are the most marked. The mental foramen often is found so near the apex of the second bicuspid root that it is easily mistaken for an abscess, and a good tooth is sacrificed. A skiagraph of the upper molars if taken at a certain angle, always will give the roots the appearance of extending into the antrum. And other perfectly normal and healthy conditions are mistaken for disease, as, for instance, it is a well-known fact that bone is not of the same density throughout its entire structure. The lime-salts are laid down in different densities and layers, and the awe-inspiring shotgun term "rarefaction" is used as though the lighter lime salt deposits are abnormal. In many instances bone-walls are viewed edge-wise and not broad-side, when we must naturally expect a different appearance. There is no rarefaction and no abnormality whatever in the darker areas.

While normal tissues all show considerable variance in the skiagraph, diseased conditions exhibit even more, and here especially is seen the necessity for the dentist himself making the interpretations. The dentist of today is more or less familiar with the normal appearance of bone. He is versed in its histology, and with that foundation soon understands what the lights and shadows of the skiagraph stand for. But of greater value than that, by reason of the position he holds with the patient, is his ability to connect the past history of the patient with the skiagraph under consideration. This most important point can not be handled by the commercial roentgenologist. The records in the case and the skiagraph must tally if a correct diagnosis is to be arrived at.

Experience has shown that the first step in a dental diagnosis is an oral examination coupled with the history of the case, and the X-ray enters the case nearly always only as confirmatory evidence. The skiagraph, while never lying itself, can not be relied upon as telling the whole truth any more than can a negative Wassermann tell you that you do not have syphilis; but if it is a positive, you may be sure you are infected. And so the X-ray can tell you that a bone cavity of certain size exists about the end of a tooth root; but it can tell you nothing as to infection or possible pus conditions. A bicuspid may appear to have but one root, but you cannot be sure of it, for often if taken at another angle, two roots are seen.

More serious still is the situation with regard to pulpless teeth. Nature never intended that a tooth should be pulpless, yet through the skill of the dentist it is a well-known fact that it is possible to save a pulpless tooth without injury to the general health of the patient. We do not claim that this is always done. Far from it; but who has the temerity to say that it never has been done? The dental pulp is essential to the tooth up to the age of about twenty-five, after which its vitality becomes less important each year, so that its loss, followed by present-day root treatment and filling methods is not such a serious matter as formerly. Yet in spite of the very best treatment even today nature does not always take kindly to the foreign material punched into it, and in perhaps ninety per cent. of the cases, the X-ray shows the withdrawal of lime salts from the apical region. But this is not always a sign of infection. *Mark that!* Here is where the wonderful word "rarefaction" and the all-knowing facial expression of the roentgenologist fits in. Thousands of such teeth have been sacrificed at his mere behest.

It has for some time appeared to me that above all other questions before the profession today is the striking of a line between a healthy tooth and one that is a detriment to the patient's health. To what extent can the X-ray be relied upon to clear the situation if it can be relied upon at all? We well know that infection from dental origin is not in the least proportionate to the size of abnormality or "rarefaction," if you will, showing in the apical region. There may be infection without enough tissue change to show in the skiagraph. The first step towards a solution of the question where the X-ray does show an abnormality then, rests in some scheme to determine if possible without the removal of the tooth, whether infection is present or not. That, it seems to me, is the crying need of our profession today. Let us for a moment pigeonhole pyorrhea, and ascertain if possible when a pulpless tooth is an actual menace, before another million teeth have been sacrificed on the altar of ignorance and guesswork.

Upon this phase of the subject let me quote from Doctor Talbot, a medical and dental authority known and recognized the world over: "Since the X-ray has come into use as a method of diagnosis, the dental and X-ray professions have called every dark area at the apical end of a tooth an abscess. A large percentage are not abscesses but simply denuded tissue, with or without absorption or caries of bone. Nearly all the tissue changes are the result of irritations, and that infections which rarely resulted were due to faulty manipulations. Gases escape from the root into the peridental membrane. They become an irritant. Naturally there results absorption of bone and root, and later destruction of the fibrous trabeculæ. Because the X-ray shows a dark area around the root of the tooth, it does not always indicate an abscess. A majority of cases diagnosed as alveolar abscesses are not abscesses, but cavities around the apical end of the root, due to absorption of bone and the trabeculæ.

"There are a number of stages in the pathologic evolution from the normal healthy tissues to a fully-formed abscess in which the X-ray does not and cannot by the present method discriminate. The causes of these conditions may be divided into irritations and infections. Most of the pathology of the alveolar process which comes under our notice for treatment is due to irritation. It is only when abscesses form in the deeper tissues about the teeth after bone-absorption has occurred that infection takes place."

I might go on to some length to show that this is true.

A general oral examination coupled with the systemic history of the patient is necessary, and the skiagraph should be used only as a last resort to confirm or deny the finer points of the examination.

Dr. Arthur Black says, "Dentists themselves should at times consult together." He further says, "Good case histories are a necessary and basic thing. The proposal to extract pulpless teeth is unsound; ninety-four per cent. showed good when vital pulps had been removed."

He still further says, "I believe the fact is now established that it is wrong to extract a tooth because it has a dead pulp. The dental profession must develop a conscience that will force it to think a little more of its duty to the public in the employment of the most tireless and painstaking technic, and to consider a little less the commercial feature of the transaction."

In conclusion, if the diagnosis is to be as nearly correct as possible, it must be done in the foregoing manner, and you can readily see that few of these things come within the scope of the professional radiographer. For him to enlarge upon the shadows is uncalled for, and as I have seen in practice, it is seldom of any real value at any time. His part consists entirely with furnishing you with clear skiagraphs without any comment whatever.

Mrs. F., suffering severely, accompanied with stiffness of neck and shoulders. Physician had no definite diagnosis and had the mouth skiagraphed by a professional radiographer. Against my advice teeth marked in *Figs. 1, 2 and 3* were extracted. Spent some time in Cincinnati hospital without relief.

Fig. 4. Mrs. P., skiagraphed at a Michigan sanitarium, and third lower molar marked by radiographer for extraction. Returned to Day-

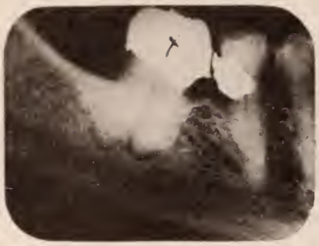

Fig. 1

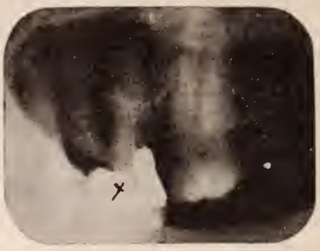

Fig. 2

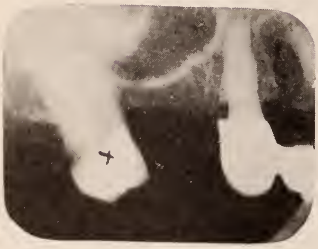

Fig. 3

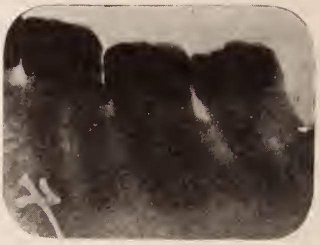

Fig. 4

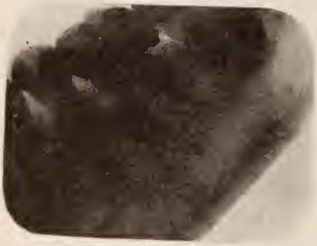

Fig. 5

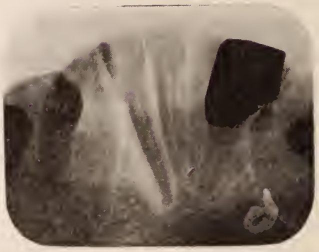

Fig. 6

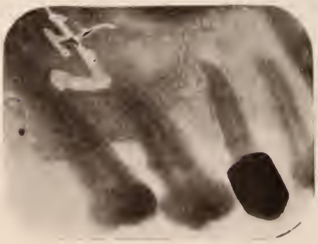

Fig. 7

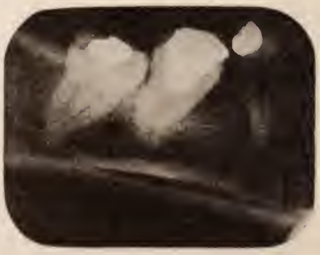

Fig. 8

ton, where I found a bit of serumal calculus on second molar to be the cause of the pocket showing on the third molar. Cleared up promptly upon a little instrumentation.

Three cases of Dr. Siegfried show in a negative way what the commercial radiographer may overlook.

Fig. 5. Lower right molar diagnosed as abscess. Fault in films.

Fig. 6. Lower right lateral read as clear. "Plainly a pyorrheal abscess."

Fig. 7. Upper left bicuspid read by radiographer, a physician as "clear." Mistake made because no root filling, tooth putrescent and abscessed.

Fig. 8. Dr. Schoff says professional radiographer wrote as follows: "No rarefaction at roots of teeth. All are in exceptionally good condition, even capped teeth." I found granuloma in apical region of second molar.

Dr. Schoff says of another case, the widow who lost skiagraph in moving to California, but for which I can vouch. Mr. E., aged about sixty, complained of a thick ropy saliva. His physician sent him to a medical man to have his teeth X-rayed. X-ray diagnosis as follows: "Absorption of aveolus on lower anterior teeth."

On examining mouth I found teeth and gums in excellent condition, and explained at some length what "absorption of the alveolus" meant, but could not convince him that his mouth was normal. He committed suicide shortly after.

28 No. Ludlow street.

The Value of Good Books

Books are masters who instruct us without rods or ferrules, without words or anger, without bread or money. If you approach them, they are not asleep; if you seek them, they do not hide; if you blunder, they do not scold; if you are ignorant, they do not laugh at you.—*Richard de Bury.*

AMALGAM*

BY JOHN V. CONZETT, D.SC., D.D.S., DUBUQUE, IOWA

IN THE MAKING of an amalgam filling, as well as the making of a filling of any kind, cavity preparation is of primary importance. The same principles govern the making of a cavity for the reception of a filling of amalgam as for any other material. It makes no difference with what material the cavity is filled, the fundamental principles are the same. Therefore, in the making of a cavity for an amalgam filling, we will follow the methods outlined by Dr. Black, the sequence of which is:

First, obtain your outline form.
Second, obtain your resistance form.
Third, obtain your retentive form.
Fourth, obtain your convenience form.
Fifth, remove any remaining carious dentin.
Sixth, prepare the cavo-surface angle.
Seventh, make the toilet of the cavity.

The outline form contemplates the making of extension for prevention and the esthetic form.

Extension for prevention means the carrying of all of the margins of the cavity into areas of relative immunity to decay. These areas are those that are in sound tooth structure and that are kept clean by the friction of the bolus during mastication, and the movement of the tongue and lips. The susceptible areas are those defects of the tooth surface caused by the failure of the enamel plates to fuse during the formation of the tooth, leaving fissures and pits in the surface of the tooth after eruption, making it possible for the organisms of decay to penetrate the enamel and begin the work of destruction upon the dentin; and all smooth surfaces that are so protected from the frictional passage of the food in mastication that the organisms of decay may attach themselves to the surface of the tooth without being disturbed. These surfaces are those upon the approximal surfaces of the tooth, especially just gingivally to the contact point, and the gingival thirds of all the teeth, especially those of a decided bell shape. In this area the bolus leaves the frictional passage over the surface of the tooth at or near the beginning of the gingival third, by reason of the bell shape of the tooth causing the gingival portion to be protected from the friction of the food by the overhanging portion of the tooth which bells out over it.

In making extension for prevention then, it will be necessary to carry all margins of the cavity upon the occlusal surface far enough to cause the margin to lie in smooth territory, that is, the fissures must be cut out to their entire extent. Whether the fissure is open or not will make no difference, for the laying of the margin of the cavity in a fissure will be to invite failure, for the possibility of the organisms attaching themselves to the rough portion of the filling made by laying the margin of the filling in a fissure will make for a probable failure. The rule for all fissure and pit cavities is to carry the cavity as far as the pit or fissure extends, and to cause the margin of the filling to lie in smooth territory.

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*A lecture given before the Ohio State Dental Society, December, 1919.

In all smooth surface cavities, the rule is to carry all margins into territory that is kept clean by the excursions of the food in mastication, or the movement of the tongue and lips. That means that the buccal, labial and lingual margins of all cavities must be cut wide enough to cause the margin of the finished filling to be clear of the approximating tooth or a filling in that tooth. If this is done then, the food as it is carried over the teeth in the process of mastication will keep the margin of the filling clean by its scouring action, and the bacterial plaques will find it impossible to form.

The size of the initial penetration of decay makes no difference with the extension, for no matter how small the cavity may be, the necessity for cutting into the area of relative immunity to decay is just the same. The only difference is that in very large cavities there is not the necessity for making extension for prevention, for the process of decay already has carried the margins of the cavity so far that they will naturally lie in territory that is immune. For this reason, the fillings that were made in large cavities in the old methods of operating were more apt to remain than were the fillings made in small cavities, hence, the habit of some of the older operators to tell their patients that certain cavities were not big enough to fill. Today we make them big enough by artificial means and thus escape the possiblity of pulpal complications made probable by allowing the cavity to grow large enough to fill.

The resistance form is that which we give to a cavity that will, to the best extent, resist the thrust forces that will fall upon the finished filling. In making the resistance form we must be guided by a study of the conditions which we find to obtain in the case under consideration. All fillings do not have to resist the same amount of force, therefore they will not all require the same foundation. Some patients will close their jaws upon the Gnathodynanometer with a pressure of from 250 to 300 pounds, while others will only exert a force of from 75 to 100 pounds. It would be foolish and cruel to cut as broad and deep for a cavity in a tooth for an individual that exerted a force of 75 pounds as we would for a patient that closed the machine with a force of 300 pounds. Likewise, it would be to invite failure if we made a shallow cavity for the strong bite that would be sufficient for the individual with the weak one. It will, therefore, be necessary to study the masticatory habits of the individual upon whom we are operating, and see whether he is an individual with a strong, heavy bite and one that masticates his food with energy and efficiency, or whether he is an individual that has a masticating habit that is weak and consequently inefficient. In the latter case, the resistance form need not be so great, but the extension form must not be neglected in the slightest degree, for in this class of cases, the ones in which the masticatory habit is weak, we have the greatest number of recurrences of decay around a filling. This, by reason of the fact that the masticatory habit of the individual is not sufficiently strong and vigorous to prevent the lodgment of the bacterial plaques upon the teeth. The very best prophylaxis possible is the thorough chewing of good coarse food which will thoroughly scour the teeth as it is being masticated, and thus prevent the formation of the deadly bacterial plaque.

The position of the cavity also will determine the amount of resistance form that will have to be made. If the cavity is in such a position that the filling will have to bear the brunt of the major part of the masticatory action, then it will have to be made correspondingly deep and broad, but if it is in such a position that little stress comes upon it, as in gingival cavities or cavities in the buccal pits, or cavities in teeth which have no occlusion, then the resistance form need not be made very deep or broad. In the making of the resistance form, more than in the determination of any of the other forms will the necessity for the careful study of conditions be necessary.

The esthetic form is that form which we give to a cavity that will, to the greatest extent, preserve the beauty of the tooth. In all art, the hiding of the art is the greatest art. Making nature appear in all of its glory and beauty is the nearest approach to artistic perfection. This is more true of the making of an amalgam filling than in the making of any other filling, for the nature of the material is such that its obtrusion in the range of vision is an esthetic error. For this reason, an amalgam filling never should be placed anterior to the distal surface of a second bicuspid, and rarely should be placed anterior to the distal surface of the first molar, for the dark color of the material is offensive to the eye. The esthetic form in cavity preparation is that form that will best conserve the beauty of the tooth, and this is best observed in the making of all external angles with a slightly curved appearance. Nature abhors an angle, therefore, it is expedient that there shall be no sharp angles on the surface of a cavity that will come within the range of vision. The esthetic form also demands that the form of the tooth shall be exactly duplicated. It will be better to restore a tooth with a material that is inharmonious as to color, rather than to have it out of harmony in regard to form, therefore, the cavity preparation must be of such shape that the form and contour of the tooth shall be exactly reproduced. In order to do this, it will be necessary to have sufficient separation so as to have room to build out the necessary contour. If there has been any appreciable loss of the mesio-distal diameter of the tooth, it will be necessary to separate before making the filling; this separation is obtained in a number of ways. The immediate separator may be used to advantage, or the separation may be obtained in advance. If so, it may be obtained by the application of a cotton twine knot tightly placed between the teeth a day or two in advance, or if the loss of tissue is great and the falling together of the teeth has been correspondingly great, a pledget of gutta-percha may be placed in the cavity allowing it to be a little full, thereby causing the patient to bite upon it, and thus causing a spreading of the gutta-percha and a forcing of the teeth apart. If the separation is to be of considerable extent, it may be necessary to repeat the placing of the gutta-percha several times, allowing the plug to stay in the tooth for several days and then replacing with a slightly larger piece, when in time, sufficient space will be obtained and the operation can be completed. The esthetic form also comprehends the finishing of the filling which should be so finished that the form and appearance of the tooth will be simulated as closely as possible.

The resistance form is best obtained by making the cavity with flat seats and parallel walls, with sufficient depth to enable the operator to pack in the cavity a sufficient mass of filling material to resist the stress that will fall upon the filling. All metal fillings are subject to flow, and if there is not a sufficient mass of metal to resist the stress of mastication, the filling will flow and a failure will result either from the material flowing away from the walls of the cavity and allowing an ingress of the fluids of the mouth, or the filling will be dislodged and fall out of the cavity. Therefore, it is imperative to know the amount of stress that will fall upon the finished filling, and then to cut the cavity wide and deep enough to allow for a sufficient mass of filling material, and have the filling rest upon a flat base surrounded with perpendicular walls.

The retentive form is that form that we give to a cavity that will to the best extent resist the pull forces that will have a tendency to lift the filling out of the cavity. This form is best obtained by the making of the cavity with parallel walls and sufficiently deep. The retentive and resistance forms are both well met by the making of the cavity as nearly box-shape as possible. In fact, the nearer we approach the form of the box the closer we are to the ideal.

In the making of an amalgam filling, however, it is permissible and even advisable to have a little more internal retention. This can be accomplished by making the interior of the cavity slightly larger than the orifice, and is best done by making a slight undercut at the bucco- and linguo-gingivo-axial angles. This is best accomplished by using an inverted cone bur, and holding the shank of the bur parallel with the buccal or lingual wall as the case may be, allowing the head of the bur to sink into the dentin to the extent of its size. This will not provide a great deal of retention, but if the filling is well condensed will be sufficient. The step may be made retentive in the same manner, but care must be exercised not to make too much undercut, for to do so will be at the expense of the strength of the tooth substance and a fracture of the tooth at that particular spot might be the result. Pits and deep undercuts are to be avoided, and are not only unnecessary but are positively harmful in that they weaken the tooth and are difficult to perfectly fill.

The convenience form is that form that we give to a cavity that will make a filling of the cavity more nearly certain. If access to the cavity is difficult and uncertain, it will be very difficult to perfectly fill the cavity, and no matter now carefully the cavity has been prepared, if it is not hermetically sealed the filling will be a failure. The filling of a cavity with amalgam is a very difficult operation and very few amalgam fillings are impermeable. It is, therefore, very essential that the cavity is of such shape that the filling material can be most easily introduced. It is very difficult to condense amalgam around a corner, therefore, it will be to the advantage of the operator to cut off the piece of tooth that prevents direct access, and in that manner he will be more likely to save the tooth. It is not possible to lay down any hard and fast rules for the making of the convenience form, for a cavity that will be impossible for one operator will be easy for another, so the only rule that we will lay down is to make every cavity of such shape that you can perfectly fill it.

If at this time there is any remaining carious dentin, it will be necessary to perfectly remove it. It is not permissible to allow any carious dentin to remain in the finished cavity, for to do so will be to invite failure by a recurrence of decay. Not only so, but the presence of carious dentin is always a menace to the life of the pulp, therefore, after the finishing of the form of the cavity, every particle of decayed dentin must be scrupulously removed.

The finishing of the cavity margins means the making of the cavo-surface angle. In the making of this angle for the amalgam filling, it is the practice of the author to make the angle longer than that advised by Dr. Black for the gold filling. By reason of the fact that amalgam has a very low edge strength, it will be necessary for us to have as great a mass of material at the edge of the cavity as possible, therefore, it is our practice to make the cavo-surface bevel the entire depth of the enamel, thus adding mass to the portion of the filling at the margin, and perfectly protecting the enamel rods as well. The margins should be bevelled all around the cavity, and can best be done by the use of the Black Marginal Trimmers.

The toilet of the cavity comprehends the cleansing of the cavity of all debris. The cavity is supposed to be made under the protection of the rubber dam and if so, there will be little difficulty in cleansing it. A blast of warm air from the chip blower, and the use of a piece of spunk or cotton will be all that is necessary. No liquid should touch the surface of the freshly-prepared dentin, for it is in the best condition to receive the filling when fresh from the operation of the cutting instruments. If it is thought necessary to use some insolating material to counteract the danger of thermal shock, a little resin dissolved in ether may be used, but care must be exercised to see that none of the material is deposited upon the margins; if it is, it must be planed away carefully.

In the making of an amalgam filling, it is imperative to have four walls, for the condensing force necessary to make an amalgam filling will cause the material to spread out from under the surface of the plugger unless it is confined. If the cavity has four walls as occlusal cavities, nothing further need be done, but if it is a proximal cavity the fourth wall will have to be supplied with a suitable matrix. There are a number of good matrices on the market any one of which may be used to advantage, but it is the teaching of the author to use a matrix made for the occasion. This is done by taking a piece of copper of thirty-six gauge and cut it wide enough for the depth of the tooth to be filled, and long enough to about three-quarter encircle the tooth. At each gingival corner a wing is turned up in order to engage the floss silk that is used to ligate it around the tooth. If this were not done the silk would slip down over the copper and would not hold it to place, but with the wings turned up they engage the silk and prevent such displacement. The copper is now placed around the tooth and tied to place by taking a couple of turns around it with a piece of dental floss. This is tied securely to place and the copper matrix shaped as the operator desires. At the point of contact a hole is now drilled with a sharp No. 4 round bur. This hole will allow the amalgam to be condensed against the approximating tooth and will make a perfect contact. The cavity being prepared, the matrix in place, the cavity is ready for the filling.

The choice of the alloy is of the utmost importance, for we know that nothing is more unreliable than a filling made from poor alloy. Happily, the work of Dr. Black has made it possible for us to have alloys that are approximately perfect at least, and from which very good fillings may be made. It is not the purpose of the author to recommend any particular alloy. The only suggestion that will be made is, that it is our belief that to make a serviceable filling of amalgam it is imperative to use an alloy made according to the Black formula. There are many of these alloys on the market and good fillings can be made from any of them.

It is essential that proper amounts of the alloy and chemically pure mercury be used. Most of the alloys have the amount of mercury to be used with them printed on the label on the bottle. The amount of alloy and mercury should be weighed out for every filling, for guesswork is uncertain and will not produce the best results. The proper amount of mercury for the alloy used should be determined, and then these amounts weighed out and used every time. A convenient method of doing this is to weigh the proper amounts and then place them in capsules and set aside until desired to use, when the capsule of alloy and the appropriate capsule of mercury can be taken and the mix made. The mix should not be too stiff, neither should it be too sloppy. There are two schools of amalgam taught today. The one demands a stiff mixture and the other a sloppy mixture. In the opinion of the author both are wrong. The stiff mix is almost impossible to perfectly introduce into the cavity, and under inspection all such fillings will be found to be permeable to moisture, while the sloppy mix though much easier to make an impermeable filling, makes a filling that possesses a very weak body and one that will not be liable to bear the stress of years of mastication. It is advisable therefore, to make the mix of such consistency that the resultant mass will take the impress of the fingers and show them plainly on its surface. The first piece may be used slightly more moist than the following pieces. After the first piece is inserted it should be pressed to place with a plugger, the point of which is almost as large as the orifice of the cavity, and then a smaller plugger should be used and the mass of amalgam worked to the walls of the cavity from the center of the mass, wedging the amalgam from the center of the cavity toward the walls thereof. This will leave a depression in the center of the filling which will be filled in by the next piece of amalgam which is now introduced and with strong pressure sent into place, forcing the material already in the cavity more firmly against the walls of the cavity by the wedging process of introducing the following pieces into the depression in the center of the mass made by driving the amalgam from the center of the cavity toward the walls with the pluggers. In this way the whole filling is built up and then should be thoroughly condensed with the hand mallet using large plugger points. Care must be exercised not to damage the enamel walls in condensing the filling by striking the enamel margin with the plugger, or a break will occur in the enamel margin that will be the cause of a failure at a later time. When the cavity is full a large piece of amalgam should be placed over the whole filling and over the margins, and heavy mallet pressure applied to the whole filling. In this way the maximum strength of the amalgam is obtained. Wait until the amalgam has hardened to some extent and then carefully remove the matrix. If the copper matrix made as advised is used, it will be an easy matter to tear the matrix where the slit has been made and remove the separated parts thereof by pulling the halves from the lingual and buccal sides respectively, and thus not disturb the contact point. The filling may now be carved to form and occlusion, the gingival portion finished with Black's knives and trimmers and the patient dismissed until a later sitting when the whole filling can be polished to a mirror finish by the use of sandpaper disks, strips and pumice.

A filling thus made of amalgam, while not as sightly as a gold filling or inlay, is one that will give years of service and will save a multitude of teeth that would be otherwise condemned to the forceps.

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GRADUAL REDUCTION OF FRACTURES OF THE MAXILLA AND MANDIBLE*

BY A. L. MILLER, D.D.S., FORT MC HENRY, MD.

IN THE GRADUAL REDUCTION OF FRACTURES of the maxilla and mandible, we are dealing with cases in which union is well under way in malposed bones, or we are endeavoring to establish a bony union when there has been a loss of substance, and attempting to influence a growth of bone in its place by use of tension following the formation of a callus. In these the osteognic processes are the same as those attending bone injuries in any other part of the body, the bone repair being dependent on the osteoblasts, and the bone resorption depending on the osteoclasts. Both processes are vitally active at all times in this class of work, for much of the newly-formed bone is again absorbed in yielding to the pressue brought to bear in an effort to correct the malposition of the bones or the malocclusion of the teeth resulting from jaw fractures.

When a case of fracture reduction is undertaken, it is most important that the exact condition of the areas involved be definitely ascertained. This applies to all cases, but more especially to those in which this method of reduction is employed, as will be explained later.

Roentgenograms should be taken in order to demonstrate the absence of teeth or foreign matter in the line of fracture or the areas involved, and the non-existence of sequestrums or infection. The presence of any of the foregoing will at least threaten the results, if not spell complete failure.

In cases in which there has been a loss of substance, the clearing away of all foreign matter, roots, etc., and the freshening up of the fragmented ends of the bone followed by their approximation and immobilization by splints, are the first and most important steps toward influencing bone formation for supplementing the lost parts. The reduction of the fracture to its proper position should not be begun until roentgenoscopy reveals a good callus with a fair deposit of lime salts. The tension at first should be very mild until it is learned just how rapidly the parts respond to the force applied. After the parts have been under tension for a few days, the force should be entirely relaxed and the parts allowed to rest; this will give Nature a chance to throw down a heavier deposit of lime salts and allow the irritation created by the applied force to subside. As soon as it is found just what amount of force is required to conduct the case in an easy and gradual manner, the force

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*Read 1920, before the Section on Stomatology (A.M.A.), of which by special arrangement, THE DENTAL SUMMARY is the representative organ for the dental profession.

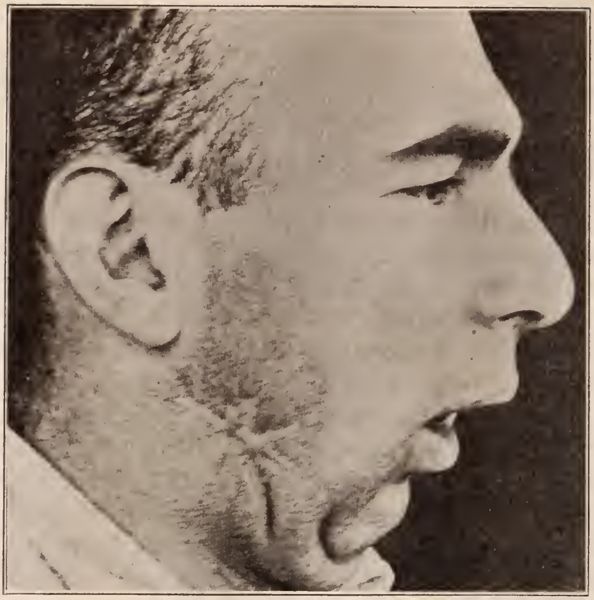


Fig. 1 (Case 1)—Malocclusion following bone graft due to miscalculation of bite in splinting. Patient unable to close mouth.

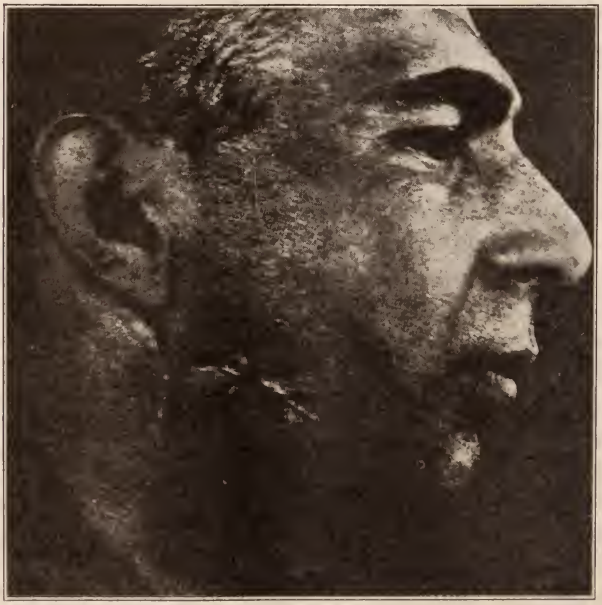


Fig. 2 (Case 1)—Self-adjusted jaws. This change was accomplished while a splint was being made for its correction. The inclined plane of the teeth exerted a sufficient amount of influence to effect the correction, showing how slight an amount of force is necessary to bring about a result if taken at the proper time.

should be kept up steadily for several days at a time and relaxed completely for a few days. This, as stated before, rests the parts and allows a heavier deposition of the lime salts. Great care should be exercised in not forcing the parts too rapidly, for such action would cause an inflammatory process and a consequent breaking down of the bony substance thus far formed, resulting in a fibrous union, while a movement to a moderate degree causes a mild irritation and a stimulation of bone deposit. Many bone grafts have been avoided and excellent results obtained by the foregoing process, following the early approximation of the fragmented ends of fractured bones.

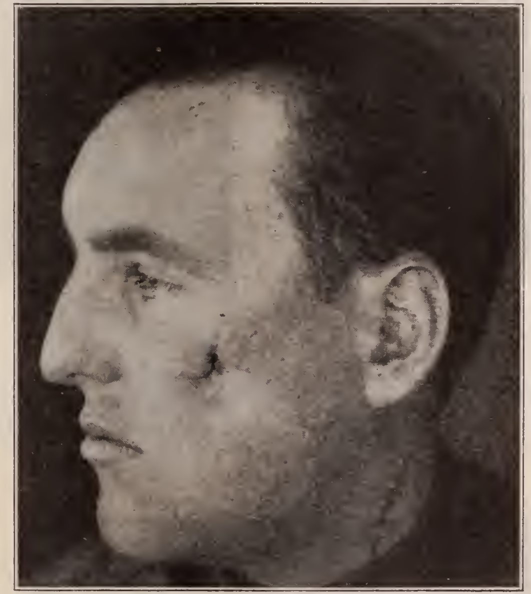


Fig. 3 (Case 2)—Fracture of superior maxillary with extensive loss of bony substance. Note retraction of superior maxilla.

The thorough cleansing of the area of all roots and infectious materials is imperative, for as soon as tension or force is applied, the irritation thus created offers an excellent opportunity for any latent infection to present itself; however, when a "flare up" of this nature occurs, the infection usually is traceable to either a root or a small sequestrum of bone, and its removal will stop all process of suppuration and the tissues rapidly return to normal. The force must be entirely relaxed during such an occurrence, and all work must cease until the tissues have regained their normal condition.

The supplementing of lost bony tissue by this method has its limitations; extensive losses cannot be supplanted, excepting by the process of bone grafting, although one case in which a loss of one and one-quarter inches was accomplished by the near approximation of the frag-

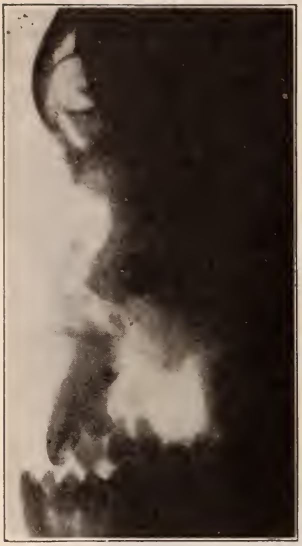


Fig. 4

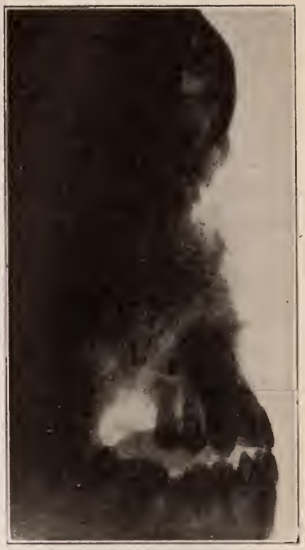


Fig. 5

Fig. 4 (Case 2)—Roentgenogram revealing loss of bony substance of palate and nasal bones, also retraction of superior maxilla. Note malocclusion of teeth.

Fig. 5 (Case 2)—Regeneration of bony tissue and occlusion of teeth after reduction of fracture.

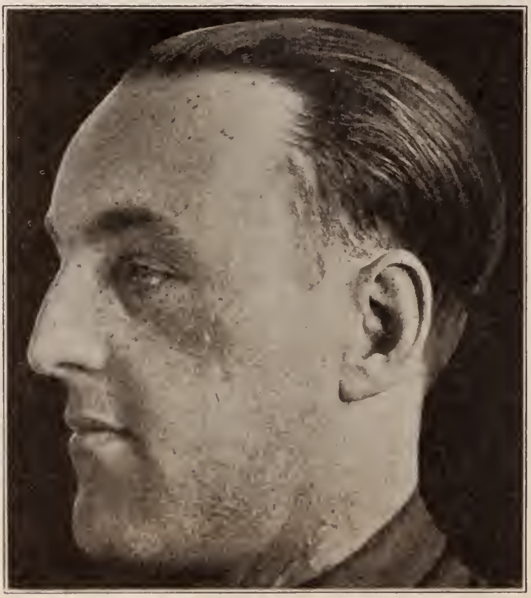


Fig. 6 (Case 2)—Appearance of patient at end of treatment.

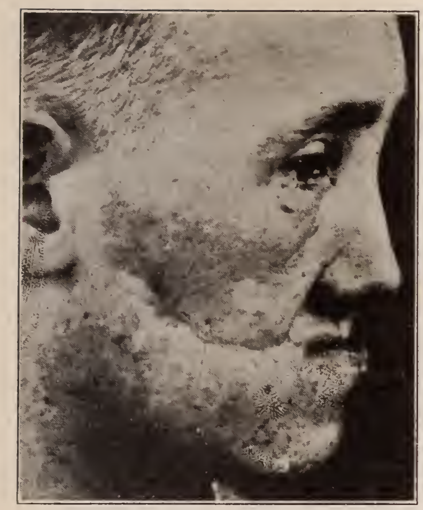


Fig 7

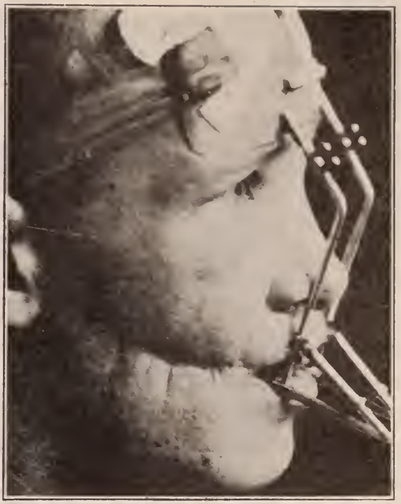


Fig 8

Fig. 7 (Case 3)—Compound, comminuted fracture of superior maxilla with extensive loss of bony tissue. Note retraction of superior maxilla and sunken condition of nasal bones and orbits.

Fig. 8 (Case 3)—Appliance in position after six weeks' treatment.

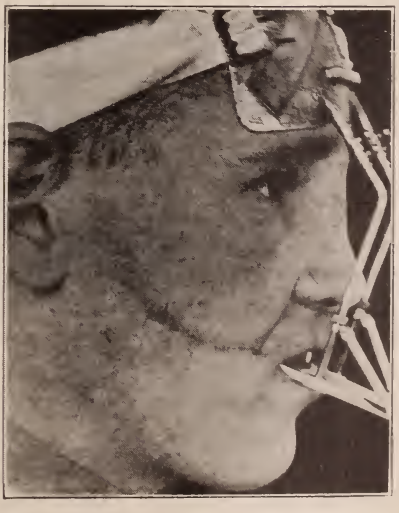


Fig. 9 (Case 3)—After two and one-half months' treatment. Note elevated condition of nasal bones and orbits.

mented ends, followed by tension after the Roentgen-ray, showed good callus formation.

When a delayed union exists, there is always a cause for it, either septic involvement, due to roots, foreign matter or sequestrums, or possibly to the lowered vitality of the fragmented ends of the bone, in which case any such matter, including fibrous tissue, should be removed, the fragmented ends of the bone freshened up and approximated, and the splints properly adjusted preparatory to applying tension following callus formation.

The means employed in conducting these cases is either interdental, intermaxillary or the combination of both, depending on the nature of the case. Very often an appliance can be used singly, on either the upper or the lower jaw, provided there is a sufficient number of teeth present to support the appliance and to withstand the necessary force required to accomplish the desired result. On the other hand, when the anchorage for the appliance furnished by all available teeth of the one jaw is insufficient to withstand the stress to be applied, it is necessary to utilize a splint anchoring from the opposite jaw in conjunction therewith.

The question of firm anchorage is one worthy of serious thought; for if the bony union is in a well-advanced stage, and the case is one presenting a lone tooth as the only support for anchorage to the one fragment, the tooth will be the one to alter its position instead of the bone in malposition; therefore it is necessary to obtain an anchorage that is firmer than the bony union of the fracture.

POSSIBLE COMBINATIONS OF TEETH PRESENT AND MISSING IN PARTIAL RESTORATIONS

A LITTLE EXCURSION IN PARTIAL DENTURE MATHEMATICS

BY W. E. CUMMER, MAJOR C.A.D.C., TORONTO, CAN.

(For The Dental Summary)

AS INDICATED by the diagram overleaf, a large number of combinations of teeth present and missing are possible in either upper or lower jaw, and which has a particular interest on the subject of partial denture design, inasmuch as it forms a basis in estimation of the number of designs possible, the indexing and charting of these and restorations therefor, and the development of simple and unassailable principles of design.

As noted overleaf, the number of combinations appear as the result of the powers of the number two. The reason for this is that the variations appear under which these combinations are made are two in number, viz., (*a*) teeth present, and (*b*) teeth absent; the number of teeth correspond to the power, or the number of times the number is multiplied by itself, as in two teeth, 2^2 power; three teeth, 2^3, etc.

While two multiplied by itself sixteen times (2x2x2x2x2x2x2x2x2x2x2x2x2x2x2x2) gives the substantial result of 65,536, so far as partial denture design is concerned, two combinations must be subtracted from this, both of the combinations of sixteen teeth fall outside of partial restoration design—to wit, all teeth present—in which case no restorations are required, and which embraces the operative problems,

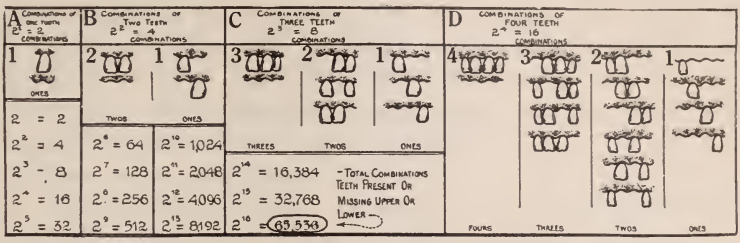


Fig. 1—Possible combinations of teeth present or missing—(two factors).

(a) Supposing the dental armament of the jaw of man was one central tooth instead of sixteen in all, the combinations possible would be as above and as follows:

One central present,
One central missing,
Two combinations in all,
or two to the first power (2^1).

(b) Supposing the dental armament of man to be two central incisors, instead of sixteen teeth, the total combinations would be as above and as follows:

Two central incisors in Twos.
Right central incisor in only Ones.
Left central incisor in only Ones.
Two central incisors out None.
Four combinations in all, or two to the second power (2^2), or 2x2=4.

(c) Supposing the dental armament of man to be three teeth instead of sixteen, two centrals and a left lateral, the possible combinations of teeth present and absent would be as above and as follows:

Three teeth present Threes.
Left central and lateral Twos.
Right central and lateral Twos.
Right and left central Twos.
Right central Ones.
Left central Ones.
Left lateral Ones
Three teeth absent None.
Eight combinations in all, or two to the third power (2^3) or 2x2x2=8.

(d) Supposing the dental armament of man was four teeth, as above in Section D, the following combinations are possible, as shown above, and as follows:

One combination of four teeth.
Four combinations of three teeth.
Six combinations of two teeth.
Four combinations of one tooth.
One combination of no teeth.
Sixteen combinations in all, or two to the fourth power, (2^4) or 2x2x2x2=16 combinations.

Illustrations by H. H. Cummer.

Proposition: If 2^4 combinations are possible with a total armament of four teeth, then with a total armament of 16 teeth, as found in either jaw of man, 2^{16} combinations are possible, a grand total as shown of 65,536 combinations.

(*Figs. 3 and 4:—No. 1*); and all teeth missing, which falls in the domain of full denture prosthesis, (*Figs. 3 and 4:—No. 256*).

It must also be remembered that the number of 65,534 represents only one jaw, of which, in this instance, the upper has been chosen. The design for the lower differs from the upper, because of the distinct anatomical difference between upper and lower teeth and their ability to carry stress or retain appliances; also the element of the narrower ridge and of the presence of the tongue, hence the above number might be logically doubled, with a result of 131,068 combinations of teeth missing or absent, which doubling is offset by the fact that a design occurring on the right side and an identical design occurring on the left are for all practical purposes the same (*Fig. 2*), leaving the actual designs possible at 65,534. While the figure takes into account only two factors, (*a*) teeth present and (*b*) teeth absent, taking no account of abnormalities of position or form, which more or less inconsiderably affect the essential features of design, but which may be provided for by comparatively simple variations in design, and, if included, would push the possible number of combinations up to a prodigious figure, of undoubtedly only theoretical value.

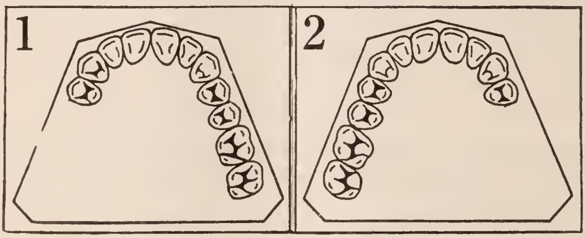


Fig. 2—Designs for possible combinations of teeth are divided by half by similar conditions occurring bilaterally. In above chart, for purpose of practical design, A is identical with B, although mathematically a different combination. All combinations in scheme here outlined have a bilateral counterpart, as above. Hence the total number of 65,534, doubled by combinations of upper and lower, is halved and brought back to 65,534 by the above.

Notwithstanding the large number of combinations of natural teeth missing and present with complication of vital, non-vital, in buccal, lingual, mesial, distal, superior or in inferior occlusion, for which we as members of the dental profession are called upon to make suitable restoration designs, the writer would submit that, in his opinion, for working purposes all of these cases may be made to fall into four simple classes, which have as their basis the choice of number and position of the direct retainer as indicated in (*Fig. 6*).

Upon these chosen teeth may be used any of the direct retainers in common use, as the various clasps, interlocking attachments, etc.

The balance of the design merely consists in supplying the saddles, joining these with elliptical wire, 14-gauge wire, cast pieces or similar, following a comparatively simple mental operation in their choice and arrangement; finally, the addition of direct retainers, indirect retainers, and occlusal rests, if indicated.

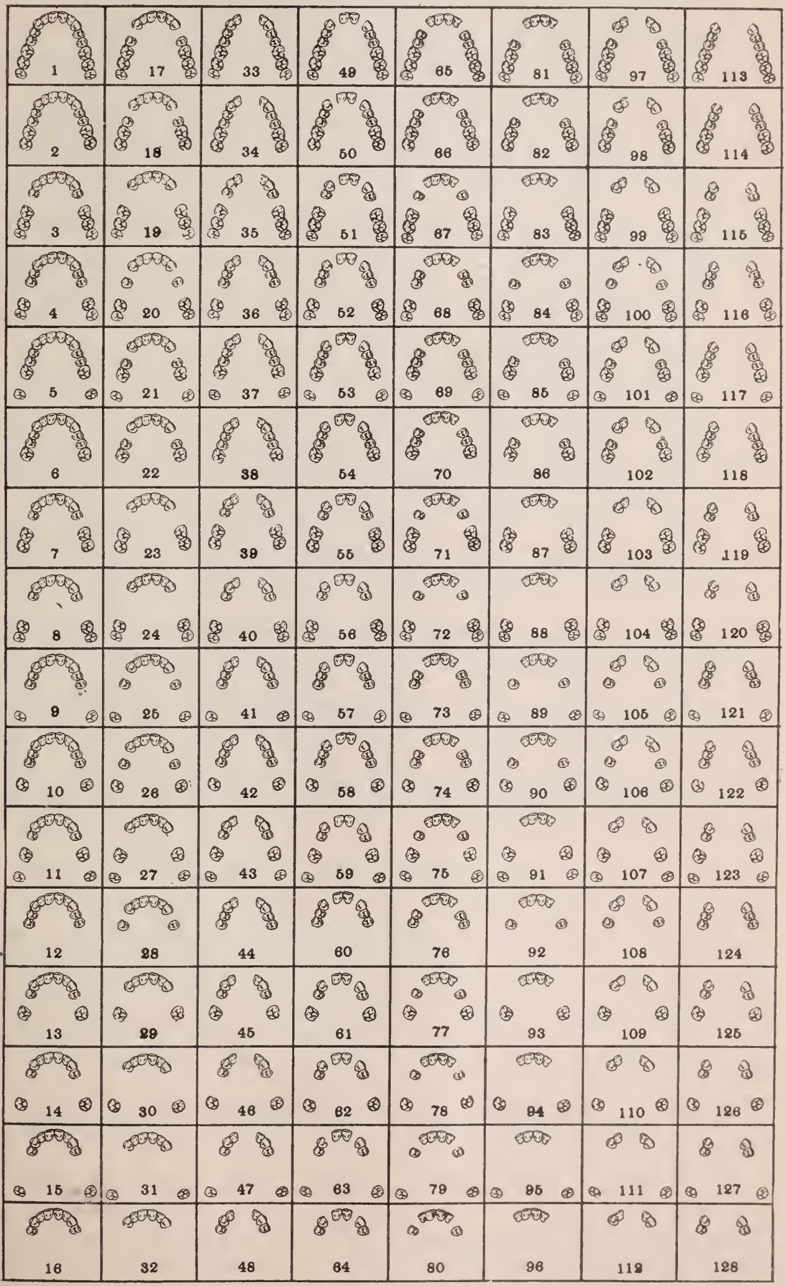
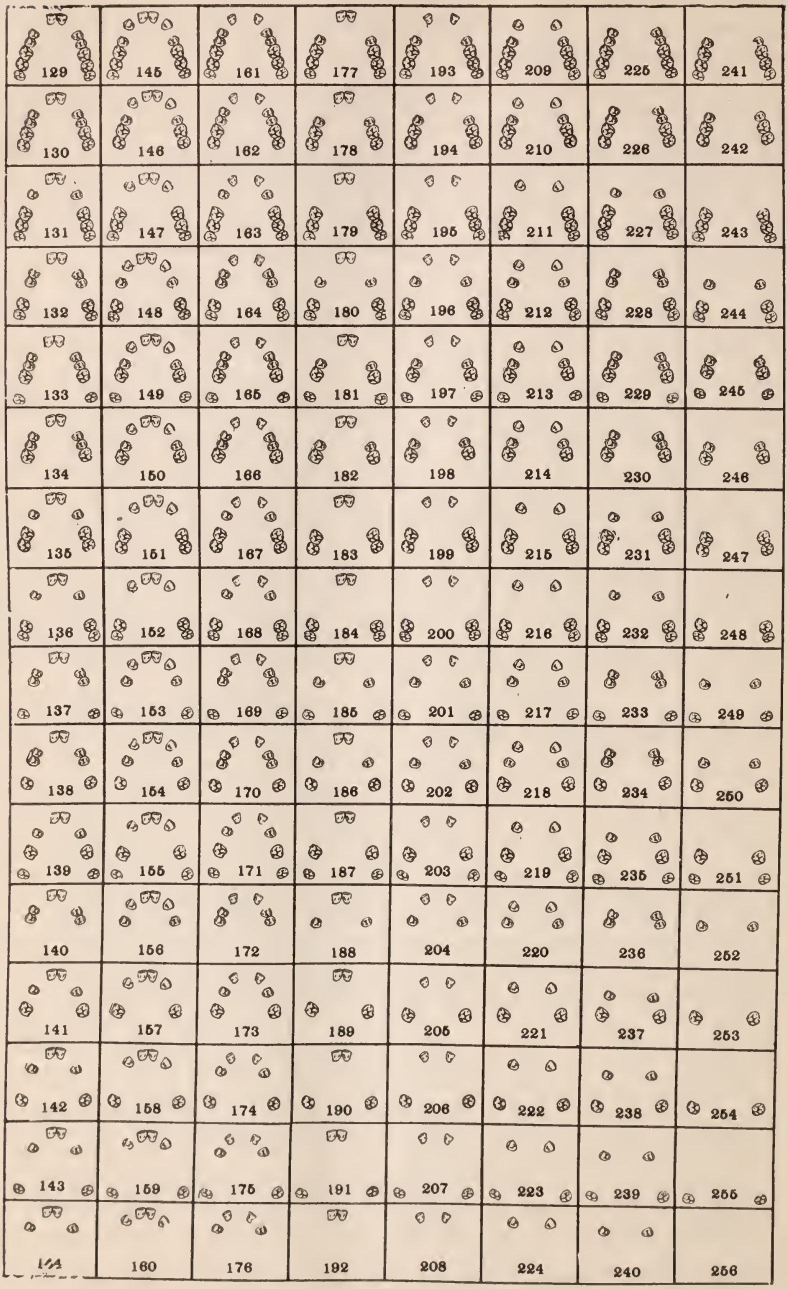


Fig. 3—All of the possible symmetrical (or same on each side) combinations of the upper teeth (present or missing only factors, not including malposition or other factors). The above was developed from the eight teeth between the left central incisor to the left



third molar, inclusive, in a similar manner as in Fig. 1. Section D (which shows the sixteen combinations of four teeth. The result of this development showed 2^8 combinations, or 256. By adding to each its counterpart on the right side, the above chart was developed. The above chart of 256 combinations represents only 1-256 of the total number of upper combinations.

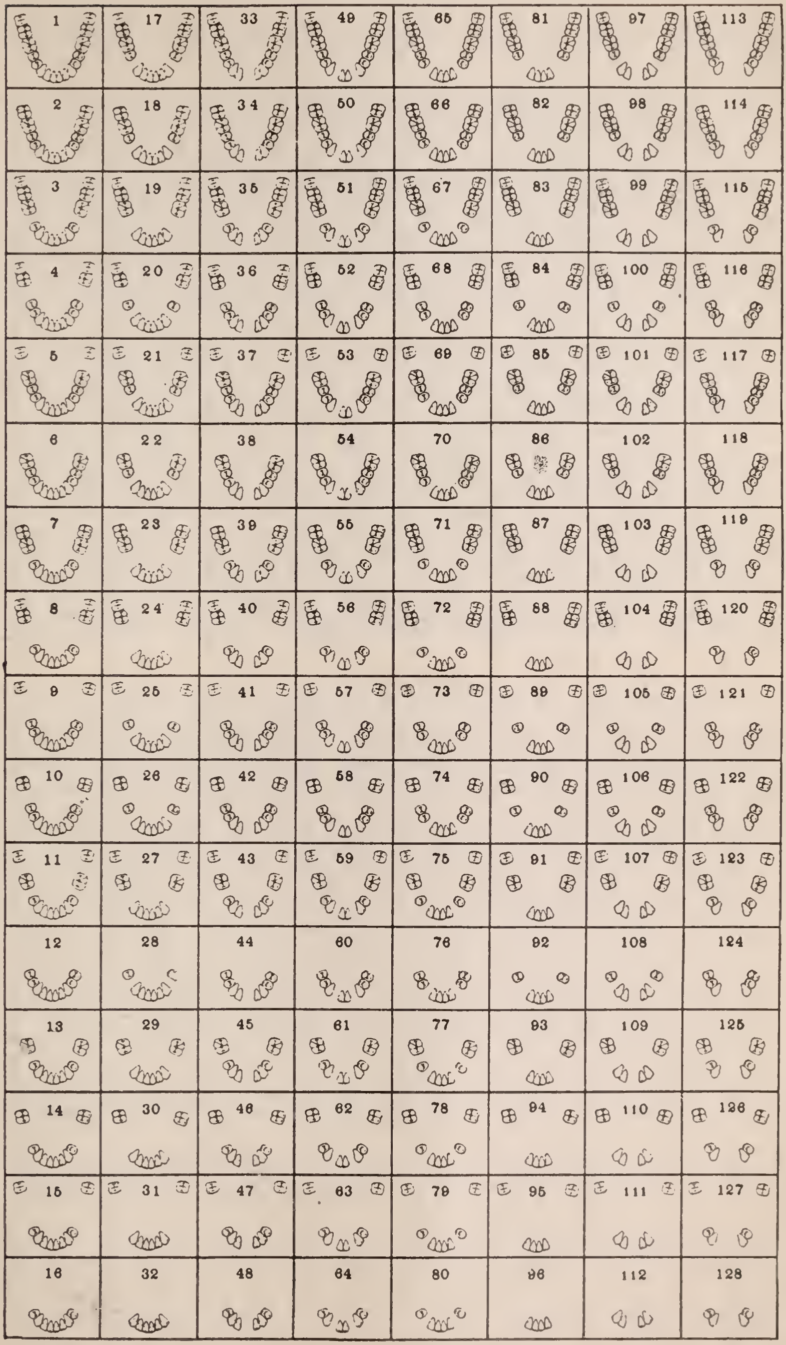
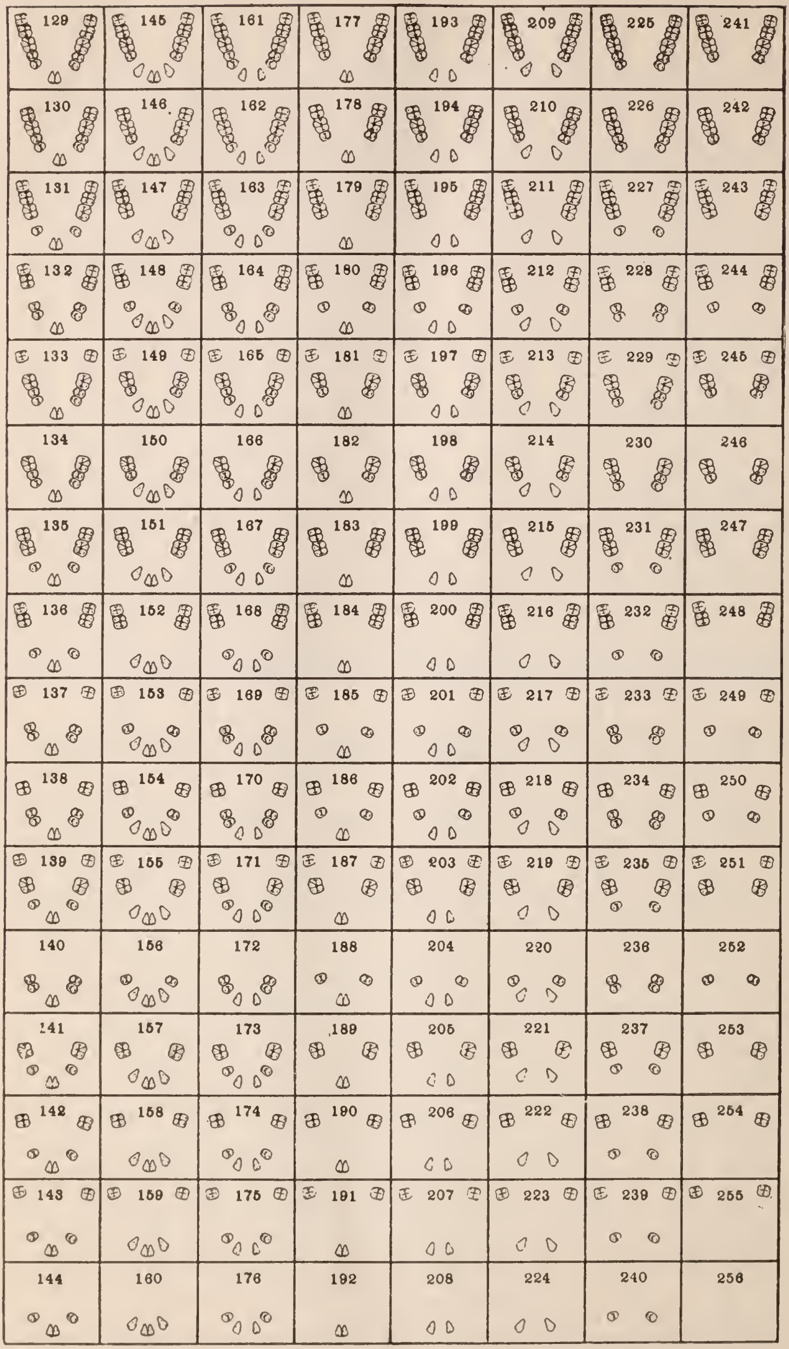


Fig. 4—All of the possible symmetrical combinations of the lower teeth (factors present or missing). This chart has been developed in precisely the same manner as



the upper chart in Fig. 3. The above chart of 256 combinations represents only 1-256 of the entire number of lower combinations possible.

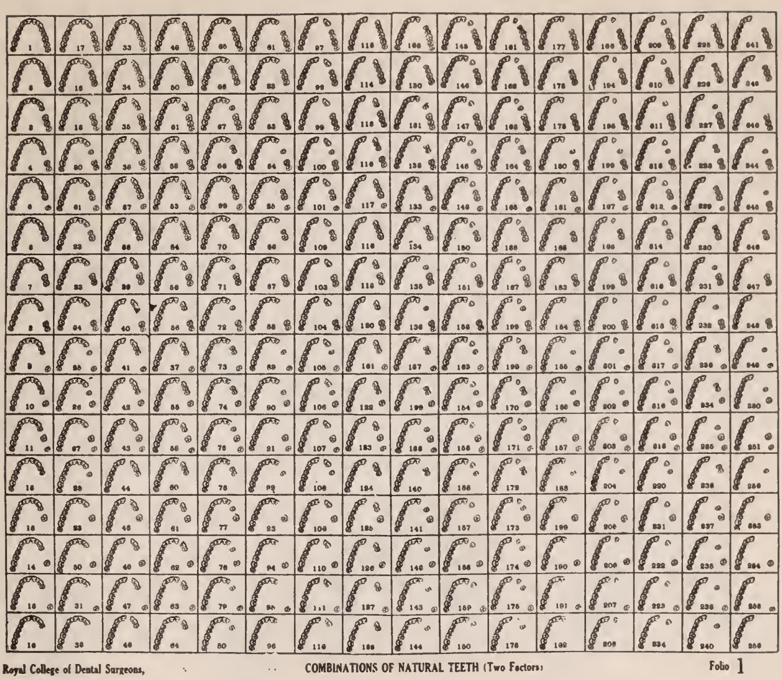

Royal College of Dental Surgeons,
COMBINATIONS OF NATURAL TEETH (Two Factors)
Folio 1

Fig. 5-A

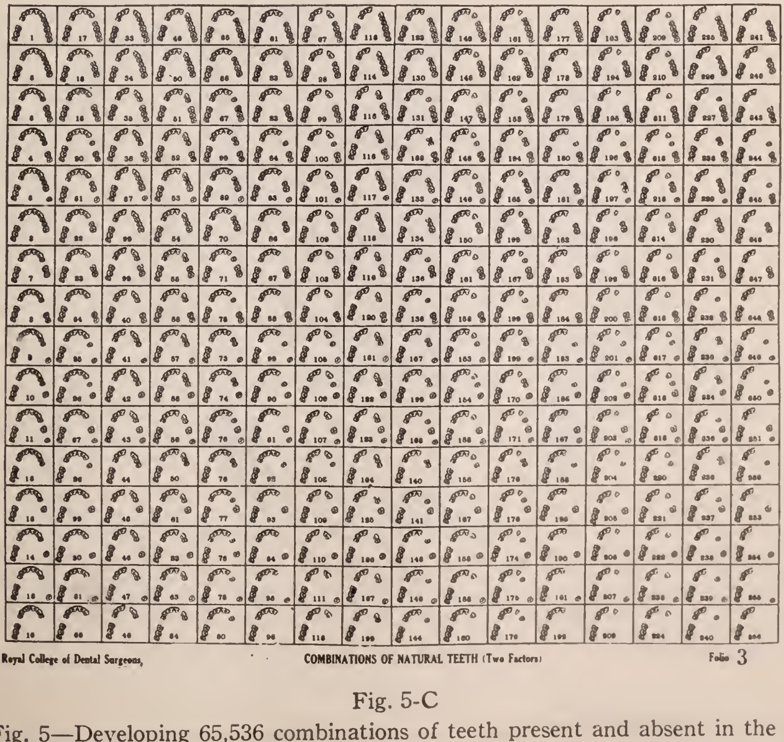

Royal College of Dental Surgeons,
COMBINATIONS OF NATURAL TEETH (Two Factors)
Folio 3

Fig. 5-C

Fig. 5—Developing 65,536 combinations of teeth present and absent in the upper mouth. The above shows 1,024 combinations of teeth present and missing in the upper mouth, or four folios of 256 each, which is 4-256 or 1-64 of the entire number possible.

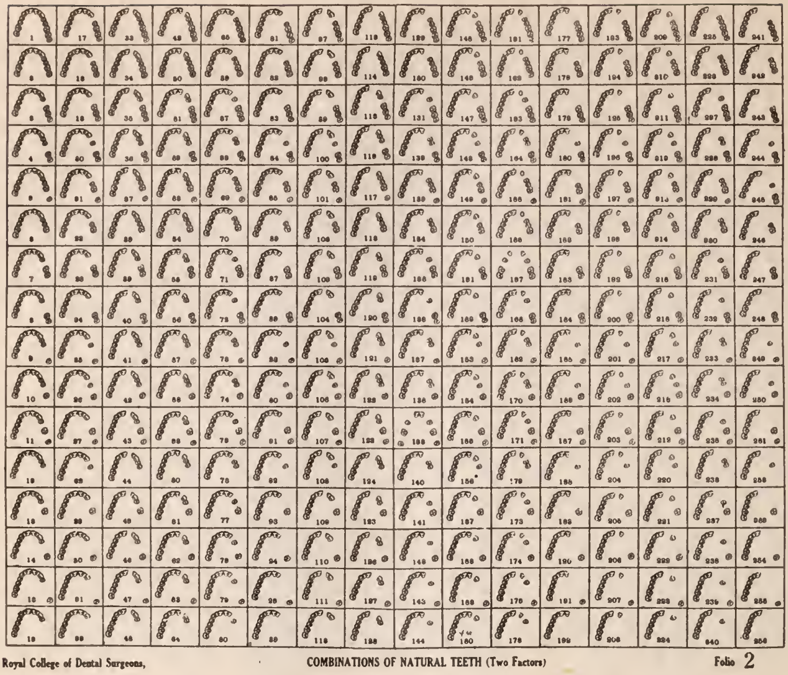

Royal College of Dental Surgeons,
COMBINATIONS OF NATURAL TEETH (Two Factors)
Folio 2

Fig. 5-B

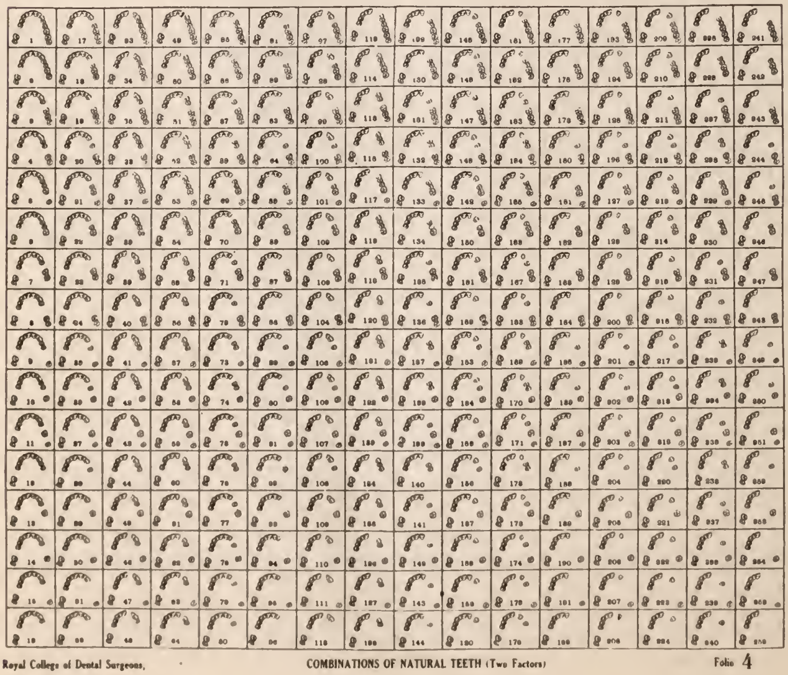
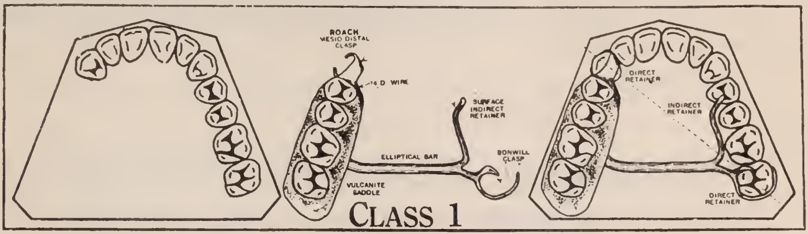

Royal College of Dental Surgeons,
COMBINATIONS OF NATURAL TEETH (Two Factors)
Folio 4

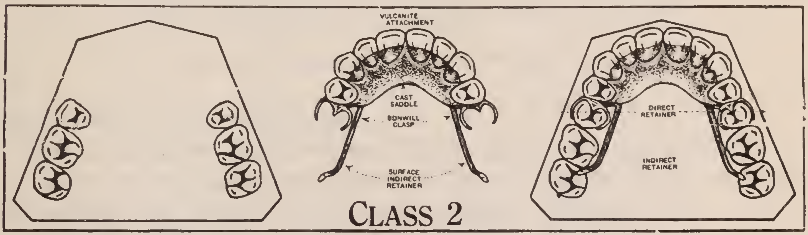
Fig. 5-D

If the above is examined with a hand magnifier, the plan of development from the symmetrical chart is readily apparent. In Fig. 5-A (Folio 1) the right half of Section 1 of Fig. 3 is successively applied to the 256 varying left halves of the same chart, giving the right side identical in each case, with the left side varying as in the symmetrical chart in Fig. 3, in 256 varieties. Similarly in Fig. 5-B (Folio 2) the right half of Section 2 of Fig. 3 (all right upper teeth present except third molar) is applied to each left half, giving 256 further unsymmetrical combinations. In Fig. 5-C and 5-D (Folios 3 and 4) the right halves of Fig. 3, Sections 3 and 4 (all teeth present save upper second bicuspid in 3, and the upper first molar in 4), are similarly applied. The charting of these combinations will be complete when the remaining 252 right halves are applied throughout in a similar fashion. This work is at present well under way at the Royal College of Dental Surgeons, Toronto, for purposes of research in denture design.



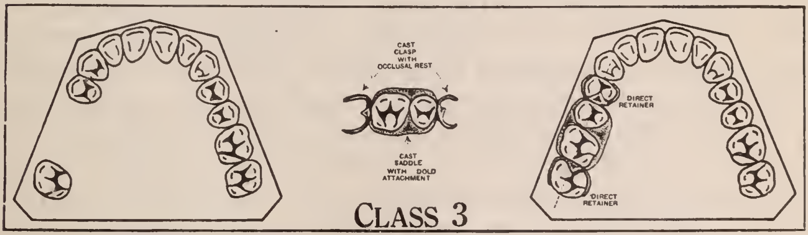
CLASS 1

CAST WITHOUT DENTURE. UPPER DENTURE. CAST WITH DENTURE



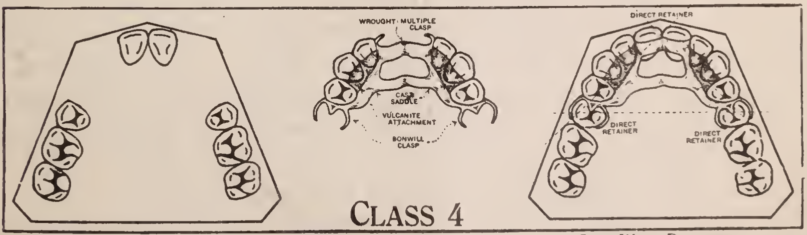
CLASS 2

CAST WITHOUT DENTURE. UPPER DENTURE. CAST WITH DENTURE


CAST CLASP WITH OCCLUSAL REST
CAST SADDLE WITH DOLD ATTACHMENT
DIRECT RETAINER
DIRECT RETAINER

CLASS 3

CAST WITHOUT DENTURE. UPPER DENTURE. CAST WITH DENTURE



CLASS 4

CAST WITHOUT DENTURE UPPER DENTURE. CAST WITH DENTURE

Fig. 6—Representative designs of the four classes of partial denture restorations depending upon the choice of direct retaining natural teeth.

Class 1—All cases in which *two teeth only*, which are *diagonally* opposite, are chosen as anchor teeth for the attachment of direct retainers, with indirect retainer or retainers as auxiliary.

Class 2—All cases in which *two teeth only*, which are *diametrically* opposite, are chosen as anchor teeth for the attachment of direct retainers, with indirect retainer or retainers as auxiliary.

Class 3—All cases in which *one or more teeth*, all of which are on the *same side*, are chosen as anchor teeth for attachment of the direct retainers, with, or usually without, indirect retainer. This class includes the majority of fixed and removable bridge designs.

Class 4—Cases in which *three or more teeth* are chosen as anchor teeth for the attachment of the direct retainers, disposed in triangular or quadrilateral or similar relationship, without indirect retainer.

240 College street.

FUNDAMENTALS OF OPERATIVE DENTISTRY*

BY W. H. O. McGEHEE, M.D., D. D. S., CLEVELAND, OHIO

PROFESSOR OF OPERATIVE DENTISTRY, DENTAL PATHOLOGY AND THERAPEUTICS, AND SUPERINTENDENT OF CLINICS IN THE DENTAL SCHOOL OF WESTERN RESERVE UNIVERSITY.

THE TREATMENT OF HYPERSENSITIVE DENTIN

IT IS CONCEDED by the best authorities that normal dentin, overlying a normal pulp, which has not been subjected to external sources of irritation through a loss of its protective covering, is not sensitive. The dentinal fibrillæ are usually protected from external irritating agencies by the enamel and cementum. Through the action of caries, erosion, abrasion, cracks and fractures of the enamel, or the careless use of scalers, or as the result of recession of the gums, they become exposed to changes of temperature, as well as to the action of salt, sweet and acid substances, with the result that they become irritated and transmit these sensations in an exalted degree to the pulp, which becomes more responsive to the stimuli. Consequently, the dentin becomes excessively sensitive to touch, or to the action of cutting instruments, and in some cases, even in the absence of dental ministrations, exhibits painful symptoms, reflected, as a rule, to other localities.

Sensitive or hypersensitive dentin then may be defined as excessive sensitiveness or over-sensitiveness of this tissue. It is abnormal sensitiveness of an exposed area of dentin, exhibiting itself in the form of reflex or localized pains, without the presence of apparent external sources of irritation, or as a result of the contact of heat, cold, salt, sweet and acid substances, or of foods and instruments.

As routine procedures in handling ordinary cases of moderate hypersensitivity, the following measures may be adopted with great benefit:

First, use tact, encourage the patient, stimulate confidence in your ability, and adopt a calm, cheerful, sympathetic manner.

Second, if a series of operations is required, select the simpler and less painful cases first, gradually leading up to the difficult ones.

Third, use sharp instruments. Cut with light, but quick, sure and decisive movements. Cut in a direction away from the pulp. If burs are used, avoid production of heat from friction, by frequently withdrawing them for a second, during the cutting process.

There are four classes of remedies used in the treatment of hypersensitive dentin, viz.:

First, physical agents.
Second, escharotics or caustics.
Third, local anodynes or local anesthetics.
Fourth, general anodynes or anesthetics.

TREATMENT OF HYPERSENSITIVE DENTIN BY PHYSICAL AGENTS

A Heat (dry or moist). Dry heat is applied by the use of the heated bulb of the chip blower, a hot air syringe or an electrically-heated blast of compressed air. The cavity may first be moistened with absolute alcohol, when the heat is applied until the cavity is thoroughly desiccated. Moist heat is applied in the form of a continuous stream of warm water during the cutting operation. The Marriam apparatus for this purpose is valuable, consisting of a water tank heated by gas, alcohol or electricity, and a rubber tube connecting it with a nozzle attached to the engine hand-piece.

B Cold. Fill the cavity with dry cotton and spray with ether, rigolene or ethyl chlorid for a few moments. Then remove the cotton and direct the spray into the cavity until desensitized.

C Light. Darken the room and use a blue bulb in the electric light socket. Whether the light acts locally, or affects the general nervous system through the vision, is not known.

D The Electric Current. The anode of the cataphoric apparatus is applied to the cavity, which is saturated with a novocain solution, while the cathode is placed in contact with the patient's body. The current is slowly and gradually increased, thus forcing the novocain solution into the dentin. The method has been largely abandoned, on account of slowness, frequent failure and production of pulp complications.

445. Describe the *Treatment of Hypersensitivity* by the use of *Caustics*.

They all prevent the transmission of sensation, by chemically destroying the ends of the dentinal fibrillæ. The agents used are zinc chlorid (deliquesced), trichloracetic acid, ten to fifteen per cent. solution, silver nitrate in pencil form, or in solutions of from ten to fifty per cent. strength, and Robinson's remedy (caustic potash and phenol, equal parts). Zinc chlorid is very irritating and should not be used in close proximity to the pulp, while silver nitrate, owing to its discoloring properties, should be used cautiously on exposed surfaces. The action of sunlight greatly increases its efficacy. The cavity should first be desiccated, before the use of all these remedies.

446. What *Local Anodynes or Anesthetics* are used in the treatment of dentinal hypersensitivity?

Cocain, novocain, menthol, oil of cloves, eugenol, phenol, ethyl chlorid, ether and chloroform.

447. How may *Cocain Be Used* for this purpose?

By one of the following methods, viz.:

A Seal into the cavity for a few days a creamy paste of cocain in liquid petroleum, or oleate of cocain.

B Apply locally and evaporate to dryness the following prescription, viz.:

℞	Cocain	gr XX
	Chloroformi	ʒ II
	Etheris q. s. ad.	℥ I—♏—(Buckley).

C Force into the dentin, with a high-pressure syringe, a solution of cocain or novocain hydrochlorid.

D Accomplish the same result with the same method as used in "pressure anesthesia," by means of unvulcanized rubber.

E Apply novocain by means of the cataphoric current.

F Apply the same remedy by means of the conductive or nerve blocking anesthesia method. The high pressure syringe and the cataphoric current are now largely abandoned.

448. How may *Menthol, Clove Oil, Eugenol and Phenol* be employed?

Menthol may be substituted for cocain in the prescription given in the previous answer. Clove oil, eugenol or phenol may be applied on a pledget of cotton and evaporated to dryness, by means of hot air, repeating the procedure several times, if necessary, as the operation progresses. Clove oil or eugenol may be combined with phenol, equal parts, and used in the same manner.

449. Describe the *Treatment* of hypersensitive dentin by *General Anodynes or Analgesics.*

A Administer potassium, sodium or ammonium bromid, XX to XXX gr., half an hour before the operation.

B Administer chloral hydrate X gr., half an hour before the operation.

C In extreme cases morphin sulphate one-eighth gr., or codein sulphate one-quarter gr., may be resorted to.

D Nitrous oxid alone, or in combination with oxygen, to the stage of analgesia is valuable in extreme cases.

E Chloroform to the same stage, although recommended by some, is contraindicated.

F Buckley's desensitizing paste also may be mentioned as a useful remedy in shallow cavities.

EDITORIAL

A DENTIST DISCOVERED WIRELESS

On another page in this issue we are printing the greater part of an article that recently appeared in one of our current publications.

It tells in an interesting way how a dentist by the name of Mahlon Loomis, of Washington, D. C., conceived the idea of telegraphing without wires and of his interesting experiments. Being unable to get the invention financed and on the market, little is known of the discovery that he made years before Marconi was born.

Dr. Loomis died in 1886, but we find no notice in the dental journals of his death nor any mention of his inventions, so we are publishing at this time an account of his wireless discovery, not only for the information it brings, but to properly record the important historical event in our dental literature.

Although Dr. Loomis as early as 1858 conceived his ideas of the possibility of wireless telegraphy, it was not until 1865 when practicing dentistry in Washington, D. C.,* that he made the real discovery which he demonstrated beyond question in 1866, in the presence of eminent scientists and electricians, by sending many messages between two stations in Virginia, eighteen miles apart, and at sea on Chesapeake Bay, between two ships two miles apart.

In 1890 Prof. Edward Branley, of the Catholic University of Paris, gave to the world the coherer.

In 1894 Marconi saw the possibility of the coherer in the field of Hertzian waves and in 1897 by means of his discoveries, sent wireless messages nine miles, in England, and as a result his wireless system took precedence over all others, thus becoming one of the great forces of our civilization.

While Marconi put wireless telegraphy upon a business footing, the fact remains that had Congress supported Dr. Mahlon Loomis when he appealed to it for financial aid, these United States could now claim the honor of this world-famous discovery.

Moreover, this view is held and defended by *The Scientific American Supplement* which in summing up its arguments about wireless telegraphy says: "A description of the actual conditions under which wireless telegraphy is today commercially successful would differ little from the theory advanced in debates on (Loomis Aerial) wireless telegraphy

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*Dr. C. A. Hawley, Washington, D. C., has furnished the following information:
In Boyd's Directory of the District of Columbia for the year 1875, I find the name of Dr. Mahlon Loomis, dentist, with office at 1207 Pennsylvania Ave., and residence at 1229 N. St., Washington, D. C.

to which the House of Representatives listened with dreamy indifference many years ago."

Mr. A. T. Story, English author, in his "Story of Wireless Telegraphy" concedes that Dr. Mahlon Loomis is credited as being the first experimenter to conceive the idea of utilizing the electricity known to exist in the atmosphere, for the purpose of establishing electrical communications between distant places. Mr. Story declares that Dr. Loomis by his method hoped to be able to communicate from one continent of the globe to another. And also that with this scheme of Mahlon Loomis we first hear of "the application of vertical conductors, or antennæ as they are sometimes called, for transmission of signals to a great distance." All other experimenters before him depended upon artificial batteries of some kind for the current, but Dr. Loomis freed himself of such limitations and thus occupies the first place, in time, of the successful experimenters.

Dr. Loomis received letters patent on his wireless invention in July 1872, and from then until his death in 1886, his struggles single-handed and alone, to win for his discovery a recognition of its worth, form an episode in the history of American invention and human life, both interesting and pathetic. Possessed of a big idea the world-wide worth of which he was absolutely positive, and living in the midst of financial resources and among men who were investing large sums for financing many less worthy enterprises, yet he was not able to command a dollar to perfect his invention and put it on a utility basis.

But such is the fate of the man with a big idea who is born too soon. It has been so, is so now, and will continue to be so. Morse with his Magnetic Telegraph in 1838, was laughed to scorn, and in place of receiving help he received sneers and ridicule. In 1873 Loomis' important discoveries were called "moonshine" and "airy nothings" and he was made the "butt of ridicule," the target of merciless arrows of wit and dubbed "a dreamer."

Nevertheless a few believed in his discoveries and supported him. In reply to those learned senators who ridiculed and sneered at Loomis and his "Aerial Telegraphic" bill and treated it as a mere chimera, Hon. O. D. Conger, of Michigan, on May 21, 1872 answered well when he said: "Sir, the visions of the seer are wont to be mistaken for the ravings of insanity. The sublime revelations of prophecy as well as the announcement of important truths have oftentimes been deemed the vagaries of those whom much learning hath made mad."

While Dr. Loomis, lacking financial aid, failed to establish his invention in such a way as to reap wealth and merited fame, his patents show that his principles were basic and scientifically correct and if Congress had been sincere and the newspapers had not jeered, the life work of this dentist would have entitled him to a niche in the History's Hall of Fame.

We are indebted to Mr. H. R. Morse, of the Loomis Institute, Windsor, Conn., for the following facts about Dr. Mahlon Loomis:

Born in Oppenheim, N. Y., July 21, 1826.

Married Achsah Ashley, May 28, 1856, at West Springfield, Mass.

As a young man he was characterized as "inventing something."

Early in life he moved to Virginia, then in 1848, he came to Cleveland, Ohio, and began study of dentistry with Dr. Wright. A year or two later he made a tour of the neighboring counties doing dentistry.

He next settled in Springvale, Va., as a dentist.

He also practiced in Earlville, N. Y., Cambridgeport, Mass., and Philadelphia, Pa.

He invented mineral plate (kaolin) process.

Afterwards he settled in Washington, D. C., where he invented wireless apparatus and made a successful demonstration over a distance of eighteen miles

For several years he tried to get a $50,000 appropriation from Congress to develope his ideas but failed.

He died at Terra Alba, W. Va., October 13, 1886.

He had one child born in Philadelphia, Pa.

FOGGING OF MOUTH MIRRORS

Every once in a while we notice in the dental journals some mention of an anti-fogging application for mouth mirrors. Something like glycerine or .soap, and the mirror smeared with such preparations is about as cloudy as the fogging itself.

We have time and again noticed dentists at the chair place the mirror in a patient's mouth, remove it and wipe it off with thumb or finger, re-insert in the mouth, remove again and wipe and repeat this process four or five times to get rid of the fogging.

Whenever we see mention of the subject our thoughts go back to pre-professional days when being tutored by a preceptor preparatory for college. I well remember a remark he made one day about the mirror clouding when inserted in the patient's mouth. "It clouds," he said, "because the mirror is colder than the mouth, and all you have to do is to place the mirror for a moment against the inside of the patient's cheek, like this, which warms the mirror to the temperature of the mouth and there will be no more fogging."

And it was so.

Gently heating the mirror over a flame or dipping in warm water answers the same purpose and is much more satisfactory than anything smeared over its surface.

COMPILATIONS

A DENTIST INVENTED WIRELESS BEFORE MARCONI WAS BORN*

BY H. O. BISHOP

A DENTIST living in Washington, D. C., invented, patented, and demonstrated wireless telegraphy before Marconi was born. Had it not been for the attitude of big newspapers, and the stubbornness and lack of vision of Congress, this country today would be enjoying the honor, distinction and credit of presenting wireless telegraphy to the world.

The name of this comparatively unknown inventive genius is Mahlon Loomis.

Back in the sixties and seventies he eked out a modest living by practicing dentistry in Washington, D. C.

Dr. Loomis called his discovery "aerial telegraphy." His first public demonstration was made in 1866 from the two peaks of the Blue Ridge Mountains in Virginia, some eighteen miles apart. From each peak an ordinary kite was elevated, connected with an insulated copper wire attached at the lower end to a telegraphing apparatus. The operators of each party were provided with telescopes with which they could sight from one station to the other and read the signals. When all was in readiness, a message was sent by the doctor along the wire of his kite, and was received at the station on the other mountain top just as though the two kites had been connected with a wire in the ordinary way. In this manner communications were kept up until the fact was thoroughly demonstrated that telegraphing could be done as readily without as with connecting wires.

Shortly thereafter Dr. Loomis made a successful experiment in communicating between vessels. This demonstration took place on Chesapeake Bay. The vessels were stationed about two miles apart. On each vessel was a telegraphic apparatus. A wire was attached to the instrument and one end thrown into the water at a moderate depth. Another insulated wire of much greater length was let down to a greater depth into a colder stratum of water. The two strata of water of different temperatures thus connected to the same battery made a complete circuit and enabled communications to pass between the two vessels without other connections. The experiment was a success. On the same principle he expressed the belief that the warm current of the Gulf Stream, if similarly connected with the adjacent cold water, would afford a means of telegraphing a great distance—perhaps as far as a

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*From an article in the *Dearborn Independent*.

decided difference in temperature is maintained. At this time Dr. Loomis also discussed with his friends the ease with which he believed it would be possible to telegraph to or from a train going at a high rate of speed.

Thoroughly to appreciate the early discoveries and successful demonstrations of Dr. Loomis it should be borne in mind that it was not until June, 1897, thirty-one years after his successful telegraphing without wires between the Virginia mountains, that Marconi, in England, sent his first wireless message a distance of nine miles.

Subjected to ridicule, Dr. Loomis was constantly pursued by the shadow of bad luck. For instance, in 1869 he had succeeded in prevailing upon a number of Boston capitalists to promise to advance the necessary money to establish his discovery on a commercial basis, when along came that never-to-be-forgotten "Black Friday" in Wall Street, which proved to be the most serious financial panic in the history of the country. His backers lost every dime they possessed.

Still undaunted, this patient and cheerful man came hustling back to his dental office on Pennsylvania avenue to extract molars until he had sufficient money to go to Chicago in 1871, where he talked his invention with such success that moneyed men agreed to finance him. But again ill luck crossed his path. The contented smile of a long-deferred success was yet fresh on his features when that perverse cow of Mrs. O'Leary's kicked over the kerosene lamp, resulting in the great fire which reduced Chicago to ashes and his backers to poverty.

In addition to endeavoring to obtain financial backing from Boston and Chicago, Dr. Loomis made constant appeals to Congress for assistance in making it possible for America to be the first country in the world to establish telegraphy without wires. He worked with that body of legislators from 1869 to 1873, when they passed a bill incorporating the "Loomis Aerial Telegraph Company," which was signed by President Grant. Congress, however, overlooked the little matter of appropriating the $50,000 asked for and naturally the corporation never got anywhere without funds.

Senator Sumner, of Massachusetts, introduced the first bill for Loomis in January, 1869. The Senator straddled the proposition and passed the buck to his colleagues in this brief speech: "I present the petition of Mahlon Loomis, D.D.S., of the District of Columbia, who believes that he has invented a new mode of telegraphing, which he submits as a great and valuable improvement upon any former mode known or discovered. He briefly says: 'The nature of the discovery or invention in general terms consists in establishing an electric current or circuit for telegraphing without the aid of wires or cables to form such electric currents and circuits. As in dispensing with the double wire (which was at first used) and using but one, allowing and relying upon the earth to form one-half of the circuit, so now I propose to dispense with both wires and all artificial batteries, using the earth for the other part of the circuit.'

"After setting forth at some length his invention of his theory, he asks Congress for an appropriation of $50,000 under such restrictions as Congress may impose, to enable him during the next year to complete the demonstration. In presenting this petition I desire to say that I perform a duty, and I content myself with remarking that it is either a great case of moonshine or it marks a great epoch in the progress of invention. I do not undertake to express an opinion upon it. I ask the reference of the petition to the committee on patents."

On the night of May 21, 1872, the House took a whack at the bill in quite interesting fashion. The bill had been introduced by John A. Bingham, of Ohio. It was reported that night by Omar D. Conger, of Michigan, chairman of the committee on commerce.

During the course of his remarks Representative Bingham said: "The only way to know whether what is here proposed is practicable, either for purpose of telegraphy or for the purposes of utilizing electricity for light or heat or motion, is to try it; and there is no way to try it, I apprehend, without some considerable use of capital. I pray the House to consider it favorably and allow it to pass. If no good comes of it there can be no harm, and favorable action by the House of Representatives on the bill will signify to the world that the House is disposed to consider, and not treat with derision and scorn, every endeavor to better in some sort the condition of individual and collective man."

The *New York World* printed this stinging editorial rebuke: "Who will not be edified to know that the time of the House of Representatives was taken up for an hour or more Monday night by an elaborate oration from Mr. Conger, of Michigan, in support of a proposition for establishing an aerial telegraph? And all this the House of Representatives listened to and the *Congressional Globe* gravely prints! And yet there are those who affect to be surprised that men of sense and character withdraw themselves from our public life! When some one asked the philosopher Crates why he took no interest in state affairs he calmly made answer: 'How can I trouble myself about public affairs when they are given over to the hands of blockheads?' "

Another editorial said: "A genius in the District of Columbia has discovered a means of telegraphing without wire or cables * * * * Senator Sumner well remarked that the scheme was either all moonshine or an epoch in telegraphing that marked a most wonderful improvement in science. Before Congress appropriates $50,000 to its development, as proposed, it would be well to find out which."

On July 30, 1872, Dr. Loomis was granted a patent covering his invention, the specifications being as follows: "Be it known that I, Mahlon Loomis, dentist, of Washington, District of Columbia, have invented or discovered a new and improved mode of telegraphing and of generating light, heat and motive power; and I do hereby declare that the following is a full description thereof:

"The nature of my invention or discovery consists, in general terms, of utilizing natural electricity and establishing an electrical current or circuit for telegraphic and other purposes without the aid of wires, artificial batteries, or cables to form such electrical circuit, and yet communicate from one continent of the globe to another. To enable others skilled in electrical science to make use of my discovery, I will proceed to describe the arrangements and mode of operation.

"As in dispensing with the double wire (which was first used in telegraphing), making use of but one, substituting the earth instead of a wire to form one-half of the circuit, so I now dispense with both wires, using the earth as one-half the circuit and the continuous electrical element far above the earth's surface for the other part of the circuit. I also dispense with all artificial batteries, but use the free electricity of the atmosphere, co-operating with that of the earth, to supply the electrical dynamic force or current for telegraphing and for other useful purposes, such as light, heat and motive power.

"As atmospheric electricity is found more and more abundant when moisture, clouds, heated currents of air and other dissipating influences are left below, and a greater altitude attained, my plan is to seek as high an elevation as practicable on the tops of high mountains, and thus penetrate or establish electrical connection with the atmospheric stratum or ocean overlying local disturbances. Upon these mountain tops I erect suitable towers and apparatus to attract the electricity, or, in other words, to disturb the electrical equilibrium, and thus obtain a current of electricity, or shocks or pulsations, which traverse or disturb the positive electrical body of the atmosphere above and between two given points by communicating it to the negative electrical body in the earth below, to form the electrical circuit.

"I deem it expedient to use an insulated wire or conductor as forming a part of the local apparatus, and for conducting the electricity down to the foot of the mountain, or as far away as may be convenient for a telegraph office, or to utilize it for other purposes.

"I do not claim any new keyboard, nor any new alphabet or signals; I do not claim any new register or recording instrument; but, what I claim as my invention or discovery, and desire to secure by letters patent, is the utilization of natural electricity from elevated points by connecting the opposite polarity of the celestial and terrestrial bodies of electricity at different points by suitable conductors, and, for telegraphic purposes, relying upon the disturbance produced in the two electro-opposite bodies (of the earth and atmosphere) by an interruption of the continuity of one of the conductors from the electrical body being indicated upon its opposite or corresponding terminus, and thus producing a circuit or communication between the two without an artificial battery or the further use of wires or cables to connect the co-operating stations. 'MAHLON LOOMIS'."

At odd intervals from early manhood until a short time before his death in 1886, Dr. Loomis kept a diary wherein he poured out his thoughts on various subjects.

The following quotation from his diary proves that Dr. Loomis was a believer in wireless telegraphy as far back as 1858:

"Washington, D. C., February 20, 1864, I got this little book today that I may collect and put together some papers and ideas that I have had for a long time upon the subject of electricity, and more particularly as that element is connected with telegraphy.

"I have been for years trying to study out a process by which telegraphic communications may be made across the ocean without any wires, and also from point to point on the earth, dispensing with wires. And the grand feature which I have hoped would characterize the plan is that the electricity (or electro-magnetism—the element or power used) would be drawn from the atmosphere, and not produced by artificial or mechanical means. To use that which nature seems to have already produced and keeps constantly on hand in such immense quantities.

"The lightning with its thunder crash seems to be the most powerful and terrible thing in nature. There always seems to be an abundance of this electrical element; and why not use it for various purposes?

"Franklin certainly did draw down electric fluid from the clouds; why not make another draft? By the perfection of appliances there is no doubt in my mind that a constant and never-failing current may be obtained powerful enough to telegraph across the ocean, to decompose water for light (or use the electric current itself for light and for various mechanical purposes). And to this end I wish to write down some facts and ideas, hoping to add more and go further until successful experiments are made and the reality of this dream come to pass.

"In 1858, August 15, I wrote a little paper, which I shall transcribe here: I believe as soon as something can be found to bear the same relation to the earth that a wire does, a telegraphic communication can be made without a wire. What relation does a wire bear to the earth? That is a question to be settled, and one which I must write more about at another time; but it serves to conduct a distinct portion of fluid from point to point, and so on.

"A subdued form of statical electricity may be used for telegraphic purposes. Dynamic and electro-magnetic fluids are both used, but both are chemically or mechanically made. Statical fluid resides abundantly in the atmosphere, and then a structure—say, of points— placed in the air at perhaps cloud height, if of sufficient amplitude, would be a never-failing source of an abundant current. This, then, may supersede the use of galvanic batteries for dynamic and electro-magnetic machines for electro-magnetism; and a great abundance always obtained without any expense but for the original structure.

"As water, especially salt water, and particularly a current of warm salt water, is a good conducting medium, a powerful current of atmospheric electricity may be made to traverse such a path from shore to shore of the Atlantic Ocean.

"The collecting apparatus, or points, may be stationed on the mountains to save building high structures, and thence conveyed on wires to the point of immediate use. And all along this conducting wire the fluid may be taken out and used for telegraphing and reinterred for further purposes. I am confident that some simple apparatus can be devised by which the atmospheric electricity can be collected."

The reader should not overlook the fact that the above ideas concerning wireless telegraphy were written by Dr. Loomis exactly sixteen years before Mr. Marconi was born in Bologna, Italy, April 25, 1874.

FRIENDSHIP

Supplies the place of everything to those who know how to make the right use of it; it makes your prosperity more happy and it makes your adversity more easy.

SOCIETY·ANNOUNCEMENTS

Michigan State

The next annual meeting of the Michigan State Dental Society will be held at the Hotel Statler, Detroit, April 11 to 16, 1921.

William H. Elliott, 7643 East Jefferson Avenue, Detroit, Michigan, chairman of the program committee; W. H. Waller, 613 Washington Arcade, Detroit, in charge of exhibits; W. A. Cook, 422 McKerchey Bldg., Detroit, in charge of hotel reservations.

CLAUDE S. LARNED, *Secretary*,
614 Post Bldg., Battle Creek, Mich.

Battle Creek, Mich.,
January 8, 1921.

Philadelphia Dental College—Alumni Society

The annual meeting of the Alumni Society of the Philadelphia Dental College will be held on Wednesday, April 20, 1921, at 9:00 A.M., in the College building, Eighteenth and Buttonwood streets, Philadelphia. All members of the Alumni should note the date and arrange to be present.

H. D. SHIELDS, *Pub. Com.*,
484 Roxborough Avenue, Phila, Pa.

Reunion of class of 1916, Tuesday, April 19, 1921. All out and as you were.

D. H. SIMMERMAN,
1010 W. Lehigh Avenue, Phila., Pa.

Massachusetts Dental Society

The fifty-seventh annual meeting will be held in Boston, Mass., at the Hotel Somerset, May 4, 5 and 6, 1921.

A cordial invitation is extended to all members of recognized dental societies.

W. VERNON RYDER, *Secretary*,
175 Newbury Street, Boston, Mass.

The Atlanta Mid-Winter Clinic

Ethical members of the profession are invited to attend the Mid-Winter Clinic of the Fifth District Dental Society, which will be held in Atlanta, on February 24, 25 and 26.

Program for this meeting will be as follows: Dr. George Winter, of St. Louis, Extraction of Lower Molars, Including Impactions; Dr.

Kurt Thoma, of Boston, Radiology; Dr. J. Lowe Young, of New York, Orthodontia; Dr. Albert Spaulding, of Detroit, the Porcelain Inlay; Dr. Theodore Meaves, of Minneapolis, a continuation of his work on inlays, with application to crown and bridge work.

Knowing these men as we do and the work they are prepared to offer, we feel assured that the coming clinic will be one of the most successful of the entire series.

The fee will be $15.00, and the membership absolutely limited to two hundred. Applications will be filed in order of receipt of checks, which should be mailed promptly to Dr. Joseph D. Osborne, Candler Building, Atlanta, Ga.

Sincerely yours, CLAUDE HUGHES,
M. D. HUFF,
JOS. D. OSBORNE,
Invitation Committee.

Alumni Society of the Dewey School of Orthodontia

The next annual meeting of this society will be held on April 25 and 26, at the Hotel Ambassador, in Atlantic City. The usual high standard of the meetings of this society will be maintained. Clinics and evening sessions will be included in the program. All interested in orthodontia are cordially invited to attend these meetings.

GEORGE F. BURKE, *Secretary,*
741-43 David Whitney Bldg., Detroit, Mich.

Texas State Dental Society

The Texas State Dental Society will hold its forty-first annual convention on Thursday, Friday and Saturday, the 3rd, 4th and 5th, of March, 1921, at Dallas, Texas.

The executive committee is endeavoring to make this meeting an unusually attractive one, and to that end will not only utilize the best talent of the society, but will bring a in few outside men of note.

Clinics will be made a prominent feature.

On Monday following, will commence the society's second annual post-graduate class course, to continue one week, and which will be conducted by the following instructors: Drs. Rupert E. Hall, Chicago; F. Ewing Roach, Chicago; T. W. Maves, Minneapolis; Arthur E. Smith, Chicago; Thos. B. Hartzell, Minneapolis; Clarence O. Simpson, St. Louis.

J. G. FIFE, *Secretary,* Dallas, Texas.

Ohio Headquarters at Milwaukee

The Ohio Dental Club sent a representative to Milwaukee in September to look over the hotels and we have selected the Hotel Wisconsin as our Ohio Headquarters. We have reserved sixty rooms for one hundred people. These are being taken very fast.

If you intend to attend the meeting and wish to be with the Ohio dentists, make your wants known to the club officers at once.

The club will have a special train leaving Cincinnati, Saturday noon, August 13, arriving in Milwaukee Sunday morning.

E. L. PETTIBONE,
6503 Detroit Avenue, Cleveland, Ohio.

Pennsylvania State Dental Society

The fifty-third annual meeting of the Pennsylvania State Dental Society will be held in the Bellevue-Stratford Hotel, Philadelphia, Pa., May 3, 4, 5, 1921. An interesting and instructing program has been prepared. All ethical practitioners are invited to be present.

W. L. FICKES, *Secretary,*
East End Trust Bldg., Pittsburgh, Pa.

Kentucky State Dental Association

The next annual meeting of the Kentucky State Dental Association will be held in Louisville, Ky., April 13, 14, 15, 1921; Seelbach Hotel as headquarters. A clinical program of unusual interest is being arranged.

Address all correspondence to, W. M. RANDALL, *Secretary,*
Louisville, Ky.

Tennessee State Dental Association

The fifty-fourth annual meeting of the Tennessee State Dental Association will be held at Nashville, May 17, 18, 19, 20, 1921.

J. J. VAUGHN, D.D.S., *Chairman Pub. Com.,*
Nashville, Tenn.

Milwaukee Dentists Entertained by Chicago Dental Society

Setting forth plans and arrangements for the next meeting of the National Dental Association, to be held at Milwaukee, in August.

By invitation of the Chicago Dental Society a large delegation of dentists from the Milwaukee Dental Society visited Chicago, Monday evening, December 20th, where they were very graciously entertained at a dinner, followed by a discussion of the plans and arrangements for the next meeting of the National Dental Association to be held at Milwaukee, in August, 1921.

Dr. E. C. Wetzel, president of the Milwaukee Society expressed the appreciation felt by the Milwaukee dentists in offering them this opportunity for social intercourse and closer alliance in our mutual interest, and extending to the Chicago Society an invitation to visit Milwaukee in March.

Dr. C. W. Hall, local chairman of the general arrangements committee, spoke of the many activities among the professional men in Milwaukee, that will appeal to our visitors as special inducements for their entertainment and for their enlightenment also. He mentioned the different clubs of which men in our profession are members, including golf clubs, canoe clubs, and many other opportunities for out-door recreations and diversions. Indeed, Milwaukee being located high above the banks of Lake Michigan and on three rivers which converge in the center of the city, affords more opportunities for water sports and recreations than any city in this country. There are 200 miles of road made of concrete, over which automobiles may speed, carrying passengers from the heart of the city into the country surrounding Milwaukee, in most enjoyable fashion. We have many small lakes too, within automobile ride of half an hour to an hour and a half where there is good fishing, boating and swimming, and alike, located in most beautiful rolling prairie lands. Every one who visits the convention will find a reception from an automobile owner which will give him these most enjoyable privileges.

As for the working of the convention we have the Milwaukee Auditorium which was erected some years ago especially for convention purposes. This building occupies a whole square block and contains assembly rooms, lecture halls and auditorium capable of accommodating the largest conventions, all under one roof. Our members then may be sure of hearing and seeing everything within its walls. Every hotel and place of amusement is reached from the Auditorium within walking distance; so our members will be able to live in the best quarters and transact business in the best meeting place in this country. We are claiming none too much for our accommodations, since we never have lost a convention when we have entered in competition with others for our city. And we may say that so many national conventions convene here time and again that our records prove the correctness of our claims. The dentists of Milwaukee are united in their efforts to make the 1921 convention the most successful in the history of the National Association; as they have the cooperation of our Association of Commerce, which directs national conventions, we can boast that nothing will be left undone that should be general for the accommodation and entertainment of its members who will attend. And we all hope that there will be merit enough in the papers, discussions, clinics and other proceedings to attract every one, so that those who attend will be happy in their surroundings, and may help to carry out our program here.

The evening session was closed by a very interesting address upon the subject of Radiography, by Dr. Simpson, of St. Louis.—J. P. C.

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NEWS and OPINIONS

CONDUCTED BY G. E. HARTER

The American Sanatorium Association, at its recent sixteenth annual meeting held at Rochester, N. Y., declared that army tests for tuberculosis were altogether inadequate, and that the life of many men was shortened by being drafted into the army when infected. The flu epidemics were declared responsible for much increase in T. B., since it left the system in poor condition to resist invasion. Some flu patients disclosed the presence of the bacillus in the lungs, while presenting no other symptoms. All of which means that the up-to-date diagnostician must be alive to every new development if he would render worth-while service to humanity.

Hold fast to your dollars just now. In a year or two each one you save is likely to be worth two in buying power as compared with present prices.

Figuring fees on a time basis is well enough to arrive at a basis of income necessary, but it is most decidedly unfair to the rapid operator if carried into every-day practice. The only rational basis for fees is Service Rendered to the Patient. Get that into your consciousness. Then render the Service. Fees will take care of themselves. A ten-minute sitting often is worth more to the patient than one of an hour or more.

If you are not certain that you know precisely how to conduct your society meetings, write Dr. P. C. Lowery, chairman, Program Committee, First District Dental Society, David Whitney Building, Detroit, Mich. He knows.

Will secretaries please write me, giving me the names of men in their organizations who are able and willing to fill engagements for lectures, papers and discussions before State and District Societies away from home? I want to get in touch with all such men. The purpose is to aid Program Committees in making up their programs.

Dr. Arthur J. Norman, of Detroit, is well spoken of as an essayist and clinician on porcelain work.

Are you a member of a study club? If not, you cannot do yourself a better turn than by joining one. If there are none in your locality, organize one.

Cordova, Alaska, has the distinction of being the home of the only woman dentist ever appointed a member of a state or territorial examining board, and the only woman who ever held a commission in the U. S. army, in the person of Dr. Von Zesch, an alumnus of the Northwestern University of Chicago. Dr. Von Zesch holds licenses in California, Texas, Arizona and Alaska. In 1906 she was appointed an army dental surgeon, with rank and pay of a lieutenant, to take charge of the refugees of the earthquake and fire at San Francisco. In 1908 she was placed in charge of the dental corps of forty men who sailed around the world with the U. S. battleship fleet. On October 11, she was appointed by Territorial Governor Riggs as one of five members of the Alaska Board of Dental Examiners. Such a record would be remarkable for a man of unusual physical and professional powers—much more so for a woman. All honor to her.

Be sure to read the article in this department headed "Professional Income." It will be found of great assistance in making up your income-tax return. Exemptions will be found especially interesting.

If you are willing to accept a professional appointment under the U. S., read the announcement of competitive examinations to be held by the Civil Service Commission. Positions to be filled pay $3,000 to $6,000 per year.

Port Clinton, Ohio is to have a free clinic.

The new compulsory education law of New York allows truants but one legitimate excuse —a visit to the dentist, and even that is surrounded by limitations that will make life a burden for the A. W. O. L.'s.

Our present public-school system puts a premium upon illiteracy. It is time that everybody began thinking and thinking hard for a complete revision of the entire proposition. Otherwise, we may expect the coming generations to become less and less intelligent as the years go by.

The Rhode Island State Insane Asylum now has a resident dentist.

Dr. Harry Lightner, Dayton, has been appointed a member of the Ohio Board of Examiners. He is a graduate of University of Maryland.

Professional Income

HOW THE FEDERAL TAX APPLIES TO THE MAN OF THE PROFESSIONS

To the professional man the problem of correctly making out an income tax return for the year 1920 is somewhat more involved than that presented to the salaried man. The wage earner on a fixed salary has an accurate estimate of the amount of compensation received for personal services, while the professional man's income varies from year to year. In the professional class may be included the physician, dentist, lawyer, architect, veterinarian, author and clergyman. Each must figure up his net income for the last year. If single or if married and not living with his wife and his net income was $1,000 or more, or if married and living with his wife and his net income was $2,000 or more, a return must be filed.

The exemptions are the same as for the year 1919. $1,000 for single persons and $2,000 for married persons living with husband of wife, and heads of families, plus $200 for each person dependent upon the taxpayer if such persons are under eighteen years of age, or incapable of self-support because mentally or physically defective. The period for filing returns is from January 1 to March 15, 1921.

The professional man must make a return of all fees, salaries and other compensation for services rendered, together with income from all other sources. If he keeps his accounts on the "receipts and disbursement" basis—which means a record of the amount received and the amount paid for expenses—he should file his income tax return for the year 1920 on that basis. If he keeps books showing income accrued and expenses incurred during the year, he must make his return from his books and include all income, even though not entered on his books. If books are kept on the accrual basis the taxpayer must include all income that accrued, even though not actually received, and may deduct items of expense, although not actually paid. Both the receipts and disbursement basis and the accrual basis are explained in instructions on the forms for filing individual returns of income.

This constitutes gross income from which the taxpayer is allowed certain deductions in arriving at net income upon which the tax is assessed. Among such deductions are the cost of supplies used by him in the practice of his profession, expenses paid in the operation and repair of an automobile used exclusively in making professional calls, dues to professional societies and subscriptions to professional journals, rent paid for office room, expense of fuel, light, water, telephone used in his office, and the hire of office assistants. Amounts expended for books, furniture and professional instruments and equipment of a permanent character are not allowable deductions. In the case of a professional man who maintains an office, but incidentally receives at his home patients, clients, or other callers in connection with his professional work, no part of the rent of the home is deductible. If, however, he uses part of the house for his office such portion of the rent as is properly attributable to such office is a deductible item.

A reasonable allowance is made for depreciation, or wear and tear of equipment and instruments used by professional men. When through some new invention or radical change in methods or similar circumstances, the usefulness in his profession of some or all of his instruments or other equipment is suddenly terminated, so that he discards such asset permanently from use, he may claim as a loss for that year the difference between the cost (reduced by reasonable adjustment for wear and tear it has undergone) and its junk or salvage value. If the apparatus was owned prior to March 1, 1913—the date the first income tax law became effective—its fair market value at that date should be considered instead of its cost in figuring depreciation and obsolescence.

Deductions for uncollectible fees form an important item in the returns of many professional men. To be allowed as a deduction, a debt must be worthless and must have been charged off within the year in which its worthlessness was discovered. The return must show evidence of the manner in which discovery was made. For example, statement should be made that the debtor has been discharged from bankruptcy or has disappeared leaving no trace, or that all ordinary means of collections have been exhausted.

A debt proved to be worthless is not always a proper deduction. Unpaid amounts representing fees for professional services are not allowed as deductions unless included as income in the return for the year in which the deduction is sought or in a previous year. The fact that expected income was not received does not reduce the taxable income. If a debt is forgiven it cannot be deducted, because it is then regarded as a gift. A debt may not be charged off or deducted in part, but must be wholly worthless before any part can be deducted.

Compensation in any form for professional services must be included as income. If a physician, lawyer, or other professional man should receive from a merchant goods in payment for professional services, the fair market value of such goods must be included as net income.

Forms for filing returns are now available at offices of collectors of internal revenue and branch offices. Collectors will mail to each person who last year filed a return a copy of the return form for 1920. Failure to receive a form, however, does not relieve a taxpayer of his obligation to file a return and pay the tax on time. Taxpayers whose net income for the year 1920 was $5,000 or less should use Form 1040A. Those whose net income was in excess of $5,000 should use Form 1040.

In addition to the individual forms, partnerships must file a return of income, or even if there was no net income, on Form 1065. Partnerships as such are not subject to the income tax. Individuals carrying on business in partnership, however, are taxable upon their distributive shares of the net income of such partnerships whether distributed or not and are required to include such shares in their individual returns. The return must show the name and address of each partner and his share of net income.

The tax this year as last may be paid in full at the time of filing the return—on or before March 15, 1921—or in four equal installments, due on or before March 15, June 15, September 15, and December 15. Payment may be made by cash, money order or check, which should be made payable to "Collector of Internal Revenue." The return must be filed with the collector for the district in which the taxpayer lives or has his principal place of business. Heavy penalties are provided by the revenue act for failure to file a return and pay the tax within the time prescribed by law.

Income Tax in a Nutshell

Who? Single persons who had net income of $1,000 or more for the year 1920; married couples who had net income of $2,000.

When? March 15, 1921, is the final date for filing returns and making first payments.

Where? Collector of Internal Revenue for district in which the person resides.

How? Full directions on Form 1040A and Form 1040; also the law and regulations.

What? Four per cent. normal tax on taxable income up to $4,000 in excess of exemption. Eight per cent. normal tax on balance of taxable income. Surtax from 1 per cent. to 65 per cent. on net incomes over $5,000.

Don't forget that humility and ability usually go together.

Dental Laws in the Making

Gentlemen: Your highly esteemed favor duly received in re. to "two copies Irwin's Dental Laws."

In reply: The legislatures are still changing dental laws or enacting new statutes.

Six states are actively legislating for dental hygienists' acts; amendments are up for action; the college classification needs law legislation to back it up, and twelve of the most stable states in the Union have commenced new dental legislation, to say nothing about some changes pending abroad, particularly in England. Some legislative bodies do not adjourn until May, 1921, when I shall "make a try" at revision.

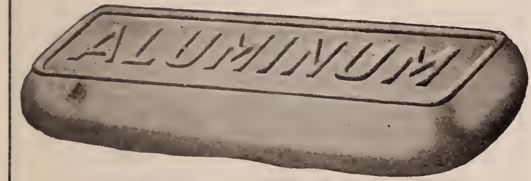
Thanking you for your kindly interest, and hoping that I may be further favored, I am,

Yours very truly,
ALPHONSO IRWIN, D.D.S.
425 Cooper St., Camden, N. J.
December 18, 1920.

Dental Examiners Elect

Los Angeles, Calif., December 11.—The State Board of Dental Examiners, which is holding examinations here, yesterday elected E. L. Dorinberger, of San Diego, President; A. E. Hackett, San Francisco, vice-president; and C. A. Herrick, San Francisco, secretary. L. R. Sevier, Los Angeles, was chosen delegate to the convention of the National Association of Dental Examiners next summer in Milwaukee.

R & R Aluminum



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Be alert for imitations which contain an excess of cheaper elements, greatly to their detriment.

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Ohio—Cleveland Study Clubs

Cleveland, Ohio, January 5.—At a meeting of the Cleveland Dental Society, a resolution was adopted providing for the creation of classes in post-graduate work for the study of oral surgery, operative technic and crown and bridge work.

The classes are to function as study clubs within the society, and considerable emphasis will be laid on pathology and diagnosis.

"Now that some forms of rheumatism and even of heart disease are being laid to defective teeth, it behooves the dentist to know more about pathology than was considered necessary in the past," said Dr. W. H. Whitslar, chairman of the program committee.

Dr. Guthrie McConnell, pathologist at the City hospital, discussed "The teeth as a source of local and systemic infections, with particular reference to the granuloma."

W. S. Sykes is president of the society.

A New Job for Lester Furnas

Cleveland, Ohio, Dec. 29.—Dr. I. L. Furnas, professor in Western Reserve Dental School, has been assigned by the International Society of Dental Prosthetists to conduct a research investigation into the properties of vulcanite rubber and plaster of Paris for the society's annual convention in Milwaukee next summer.

A special laboratory is being outfitted at the school for the experiment. The results are expected to be of the greatest aid to the profession.

A museum and library has been opened recently for the dental department of the university. Accommodations have been made for 50,000 volumes. Several thousand gift volumes have been received.

Ironton Denist Enters U. S. Army

Ironton, Ohio, December 24.—Harry R. Smith, prominent local dentist, has been permanently commissioned in the U. S. Army as acting Assistant Dental Surgeon, with the rank of captain, and reported to Surgeon General E. E. Buel, at New York City, on January 1.

During the war Dr. Smith held the rank of major with the medical department of the Thirteenth Railway Engineers and saw extensive service in France, having been one of the first Ironton officers to go abroad. He served throughout the war with honor and distinction and upon his return to Ironton engaged in his dental practice.

Kentucky—West Central

Hopkinsville, Ky., December 31.—Dental surgeons from Christian, Hopkins, Trigg, Caldwell, Todd, Muhlenberg and Webster counties gathered here last night for the annual meeting of the West-Central Kentucky Dental Society. J. H. Bray, Greenville, presided; T. C. Underwood, editor of the New Era, delivered a welcome address; B. F. Atwood, Rochester, Ky., R. Boyd Bogle, Nashville, and Powell Wolfe, Princeton, were speakers.

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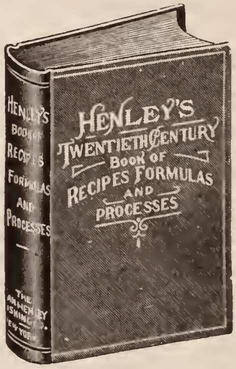

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Indiana—Elkhart

Elkhart, Ind., January 8.—At a well-attended meeting of the Elkhart Dental Society last evening in Dr. J. F. Werner's office, the following officers were elected: President, Von L. Kennedy; vice-president, L. E. Shoup, and secretary-treasurer, R. N. Douglas. The next meeting will be held on February 1, in Dr. George Menges' office, the subject for the session, "The Business Side of Dentistry."

Indiana—Grant County

Marion, Ind., January 7.—The Grant County Dental Society elected the following officers, at an enthusiastic meeting held last night in the office of Dr. A. H. Unthank: H. F. Hazlett, president; A. E. Ross, vice-president; J. Bruce Gordon, secretary, and O. M. Flinn, treasurer. W. W. Mott, Van Buren was named supervisor of clinics. H. F. Gravelle and A. H. Unthank were named as a publicity committee.

Indiana—Isaac Knapp Coterie

Fort Wayne, Ind., December 21.—New officers have been named by the Isaac Knapp Dental Coterie. They are: President, W. M. Armentrout; vice-president, H. T. Berkey; secretary, S. J. Purviance; treasurer, J. S. McCurdy.

Missouri—Southwestern

Joplin, Mo., December 17.—The Southwest Missouri District Dental Society closed a three-day convention at the Connor hotel yesterday by electing officers for the coming year.

J. J. Barnett, of Joplin was elected president; D. L. Mitchell, of Neosho, vice-president, and W. W. Brown, of Joplin, secretary and treasurer.

Emmett Craig, of Kansas City and Lee H. Johnson, of Vinita, Okla., made the principal addresses at the closing sessions.

The meeting was the most successful in the history of the organization. One hundred delegates from all parts of the district attended.

Tennessee—Maury County

Columbia, Tenn., December 16.—(Special)—The Maury County Dental Society gave a dinner at the Bethel Hotel Tuesday night. Every member of the society was present, and in addition quite a number of visiting dentists, among them being Dr. B. H. Johnson, of Nashville, who discussed in a most interesting manner, "The Business Side of the Profession." J. W. Winn, also of Nashville, conducted a clinic in gold inlays. A. G. Buckner, state oral hygienist, Maj. H. B. Butler, who is in charge of the hygiene unit here, Miss Verna Thornhill, also attached to the unit and several members of the Maury County Society made short talks.

Iowa—Research Club

Des Moines, Ia., January 7.—The Des Moines Dental Research club elected officers for 1921 at a meeting held last night at the Grant club. K. W. Knapp was chosen president; J. B. Hathorne, vice-president; Floyd C. Coppersmith, secretary, and W. F. Coles, treasurer.

"Extensive plans were made for clinical and research work during the coming year," said M. I. Lutz, the retiring secretary. The members have been divided into six sections which will delve into six distinct fields of dental work; inlay, bridge work, porcelain work, prophylaxis and pyorrhea, anesthesia and root canal work. It is our aim to raise dental work in Des Moines and Iowa to the highest possible standards.

Iowa—Northwestern

Sioux City, Ia., December 7.—J. L. Conger, of Sioux City, was elected president of the Northwestern District of the Iowa State Dental Society at the annual convention here, Saturday. Dr. Miner was elected vice-president; C. E. Westwood, secretary, and J. L. Schott, also of Sioux City, treasurer.

The Mystery

"The fool and his money are soon parted," observed the Old Fogy.

"That is to be expected," replied the Grouch. "The mystery is how they ever happened to get together in the first place."—*Cincinnati Enquirer.*

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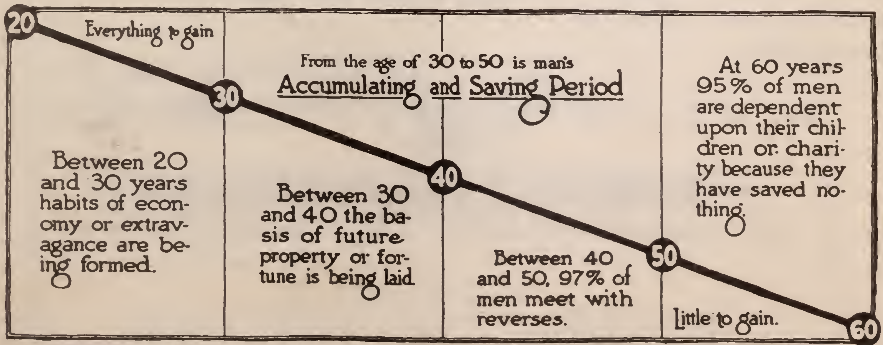

U S. Clinic at Minneapolis

Minneapolis, January 4.—Dental clinic accommodations for the 203,000 former service men in the Northwest district were provided today with the opening of a unit of the United States Public Health Service system in the Plaza building, Hennepin avenue and Oak Grove street. The clinic is to be operated under the direction of Dr. L. A. Walker, supervising surgeon for this district.

The most modern instruments and equipment known to dental surgery are rapidly being installed; composed of five chairs with the modern unit system of mechanical instru-

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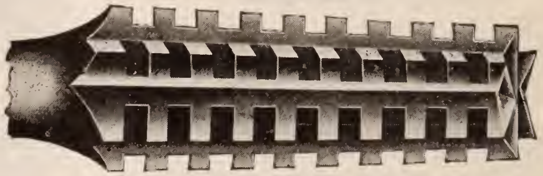

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ments. The laboratories and X-ray suites are nearing completion and will be in operation in a short time.

The clinic at the Plaza hotel is primarily for treatment of Minneapolis cases. It is planned, however, to treat the more difficult dental surgery cases from throughout the district, composed of Minnesota, Montana and North and South Dakota, in the Minneapolis clinic.

At present, much of the work throughout the district is being done by 325 civilian dentists. The civilian dentists treat the cases after applications for dental work have been approved by Dr. Walker. Treatment is open to all honorably discharged service men and women, including nurses, whose conditions is directly traceable or was aggravated by military service.

Ability Recognized

Valparaiso, Ind.—Dr. C. A. Nixon, of this city, has received official notice of his appointment for a five-year term on the National Dental Educational Council of America. Dr. T. A. Broadbent, of Chicago, was appointed on the same board for a term of two years. There are fifteen members on this board in America, and their work has to do with the rating of the educational standards of dental colleges in the United States. Dr. H. C. McKittrick, of Indianapolis, secretary of the Indiana State Board of Dental Examiners, is president of the National Board of Dental Examiners.

Coming Events

February 7,—Iowa State Board, Iowa City

February 9, 10, 11, 12,—Minnesota State, St. Paul

February 24, 25, 26,—Atlanta Mid-Winter Clinic, Atlanta.

March 3, 4, 5,—Texas State, Dallas

April 11 to 16,—Michigan State, Hotel Statler, Detroit

April 13, 14, 15,—Kentucky State Dental Association, Seelbach Hotel, Louisville.

April 20,—Alumni Society of Philadelphia Dental College, College Building, Philadelphia.

April 25, 26,—Alumni Society of Dewey School of Orthodontia, Hotel Ambassador, Atlantic City.

May 3, 4, 5,—The Pennsylvania State Dental Society, Bellevue-Stratford Hotel, Philadelphia.

May 4, 5, 6,—Massachusetts Dental Society, Boston.

May 17, 18, 19, 20,—Tennessee State Dental Association, Nashville.

June 6 to 10, entire week— Northern Ohio, Hotel Statler, Cleveland

Government Positions Open to Competitive Examination

Chief, Section of Dental Referees, $4,000 - $6,000—
Receipt of Applications to Close March 1, 1921.
Dental Referee, $3,600 to $4,000 a Year—
Assistant Dental Referee, $3.000 a Year—
Applications will be Rated as Received
Until May 3, 1921

The United States Civil Service Commission announces open competitive examinations for the positions listed above. Vacancies in the Bureau of War Risk Insurance, Washington, D. C., at the salaries indicated, and in positions requiring similar qualifications, at these or higher or lower salaries, will be filled from these examinations, unless it is found in the interest of the service to fill any vacancy by reinstatement, transfer, or promotion.

The entrance salary within the range stated for the position of dental referee will depend upon the qualifications of the appointee as shown in the examination.

Citizenship and sex—All citizens of the United States who meet the requirements, both men and women, may enter these examinations; appointing officers, however, have the legal right to specify the sex desired in requesting certification of eligibles.

On account of the needs of the service, papers will be rated as received, and certification made as the needs of the service require. In the absence of further notice applications for these examinations will be received by the Commission at Washington, D. C., until the hour of closing business on March 1 and May 3, 1921, respectively. If sufficient eligibles are obtained the

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receipt of applications may be closed before that date, of which due notice will be given.

Duties—The duties of dental referee will consist of examining case files and making disability ratings based upon medical and dental evidence contained in reports of physical and dental examinations obtained from medical and dental officers in the field, answering correspondence relative to claimants, and performing routine work connected with the medical and dental aspect of claimants.

The duties of assistant dental referee will consist of passing dental opinions and making disability ratings based upon the evidence in the case files.

Subjects and weights—Competitors will not be required to report for written examination at any place, but will be rated on the following subjects, which will have the relative weights indicated:

Subjects	Weights
1. Education and training	30
2. Experience	60
3. Physical ability	10
Total	100

Basis of ratings—Under the first two subjects competitors will be rated upon the sworn statements in their applications and upon corroborative evidence.

Education and experience—Applicants must have been graduated from a dental school of recognized standing and have had, subsequent to such graduation, for the position of dental referee, at least three years of active practice, and for the position of assistant dental referee, at least two years of active practice.

Additional credit will be given for experience as a dental surgeon with the Army, Navy, or United States Public Health Service, or in practice involving special experience along the lines of duties mentioned above.

Age—Applicants must not have reached their seventieth birthday on the date of making oath to the application. At the request of the department making appointment certification will be made of eligibles who are within reasonable age limits.

Retirement—Classified employees who have reached the retirement age and have served fifteen years are entitled to retirement with an annuity. The retirement age for railway mail clerks is 62 years, for mechanics and post-office clerks and carriers 65 years, and for others 70 years. A deduction of two and one-half per cent, is made from the monthly salary to provide for this annuity, which will be returned to persons leaving the service before retirement with four per cent. interest compounded annually.

Photographs—Applicants must submit with their applications their unmounted photographs, taken within two years, with their names written thereon. Proofs or group photographs will not be accepted. Photographs will not be returned to applicants.

Residence and domicile—Applicants will be admitted to these examinations regardless of their residence and domicile; but only those who have been actually domiciled in the State or Territory in which they reside for at least one year previous to the examination, and who have the county officer's certificate in the application form executed, may become eligible for permanent appointment in the apportioned service in Washington, D. C.

Oral examination—An oral test may, if found desirable, be given at selected points to competitors who attain an eligible average to determine personal characteristics of address, tact, judgment, adaptability, and general fitness for the performance of the duties of these positions. This test will be given to competitors in the order of their standing and only to such number as may be necessary to meet the needs of the service. An applicant who fails to pass the oral test will not be eligible for appointment.

Applications—Applicants should at once apply for Form 1312, stating the title of the examination desired to the Civil Service Commission, Washington, D. C.; the Secretary of the United States Civil Service Board, Customhouse, Boston, Mass., New York, N. Y., New Orleans, La., Honolulu, Hawaii; Post Office, Philadelphia, Pa., Atlanta, Ga., Cincinnati, Ohio, Chicago, Ill., St. Paul, Minn., Seattle, Wash., San Francisco, Calif.; Old Customhouse, St. Louis, Mo.; Administration Building, Balboa Heights, Canal Zone; or to the Chairman of the Porto Rican Civil Service Commission, San Juan, P. R.

Applications should be properly executed, *including the medical certificate*, and filed with the Civil Service Commission, Washington, D. C., without delay.

The exact title of the examination desired, as given at the head of this announcement, should be stated in the application form.

Preference—Applicants entitled to preference should *attach to their applications* their original discharge, or a photostat or certified copy thereof, or their official record of service, which will be returned after inspection by the Commission.

Issued January 14, 1921.

Dentist Commissioned

DR. JOHN M. HENDERSON APPOINTED MEMBER OF ANNUAL ASSAY BODY TO TEST COINS

Columbus, O., January 18.—Dr. John M. Henderson, a dentist with offices in the Citizens' Bank building, has been appointed a member of the Annual Assay Commission to test the weight and fineness of the coins reserved by the several mints of the United States during 1920. At all the mints, out of every delivery of coin to the treasury, several pieces are taken and forwarded under seal to the Philadelphia mint for examination by the commission in order to secure a due conformity in the gold and silver coins to their respective standards of fineness and weight. The commission will meet at the Philadelphia mint at 10:00 A.M., Wednesday, February 9, for a four-day session.

Jazz is music gone Bolshevik.

Has America No Answer for This German Threat?

While men talk about disarmament and fill the newspaper columns with learned discussions as to the wisdom of curtailing our naval program by international agreement, hour by hour the day of our real disarmament approaches, and approaches so stealthily the great public is in entire ignorance of the fact.

In the next war, leaders will laugh at battleships and artillery when they launch their assaults of poison gas and invisible destruction. The machinery of warfare has passed into the hands of chemists.

An inkling of the truth may be obtained from a cable dispatch, written by Wythe Williams, which appeared in the *Washington Herald* of January 10. We quote from it:

"There is evidence in Paris, where a large force of dye experts now are gathered to help the reparations commission, that the German dye attack is to be centered most vigorously upon the United States market. France has a tariff law that enables her to build up her dye industry unmolested. England has a new law, operative January 15, that excludes dyes such as she produces and admits those she does not produce, but which her consumers need. Japan is taking steps to protect her chemical industry. The United States is the only important nation actually at the mercy of German chemists. For the moment America is protected by the War Trade Board, but this barrier will fall when she ends the technical state of war with Germany.

"German dye manufacturers, realizing this, are causing the reparations commission much trouble by refusing to produce, except under pressure, the dyes most needed in the United States. They are willing to offer large quantities of dyes in competition with the output of the new American dye industry, but still are making excuses for failure to produce noncompetitive dyes. Thus they hope to encourage consumers to demand an open market. Also, in this manner, with the experience of her fifty years' world monopoly of dye manufacture against five years of American experience, Germany hopes to throttle the American industry and leave America helpless in this respect should there be another war.

"Germany production of dyes is so closely allied with her production of munitions that a separation is impossible. Destruction of one would mean the destruction of both. Students of the German proposals now in Paris consider that America is the last hope the German manufacturers have, and they will not give up as long as America does not protect its dye industry by a law similar to that of Great Britain. They see, further, that real chemical disarmament can be accomplished only by breaking Germany's monopoly of the dye industry and encouraging the building up of a similar industry in all the countries of the entente, and especially in the United States."

It is the absolute truth that the "United States is the only important nation actually at the mercy of the German chemists."

The War Trade Board, which now protects the American dye industry, will go out of existence March 4 unless funds to finance its activities are provided, and it will go out of existence anyhow so soon as peace is concluded. The dye industry, therefore, is nearing hour by hour the day when it will be at the mercy of the Germans. That will not be long. Private industry does not possess the power to taxation and cannot long stand up under heavy financial losses. If there is no inhibitory legislation, enough dyes can be dumped on our shores with a few months to swamp the market

It is difficult to speak with moderation of those Senators who have resorted to the filibuster and every other technical device of legislators to delay and prevent enactment of the dye bill. Be their motives what they may, the fact remains that their course is exactly the course that is most acceptable to the Germans. Men who shape their course in Congress so as to support a policy obviously beneficial to our enemies and destructive to the United States necessarily are objects of suspicion. Men are judged not by their motives, but by the things they do, and when the things they do are fatal to the future well-being of their country, they must expect criticism. This is more than ever true when they obstruct the majority and employ their technical power of delay to prevent an enactment favored not only by the House of Representatives and recommended by the President, but also favored by a large majority in the Senate itself.

There is history back of this entire situation. The statesmen who went to Paris to write the Peace Treaty were well aware that a mere physical disarmament of Germany would be a grotesque provision against the later attack by that nation. They favored not merely the destruction of the German navy and the disbandment of the German army, but they also expected to compel the Germans to disclose their chemical secrets, vital in warfare, and the dismantlement of huge chemical works was contemplated. This essential and wise course was prevented by President Wilson, who advanced the idea that the Allies and the United States could adequately protect themselves by building up their own chemical industries, shutting out the German product. He favored compelling the Germans to disclose their chemical secrets, which they have not done, but he wanted each individual nation to protect itself.

That is what all of the chief Allies and neutral nations have done—all except the United States. Over in England the Government listened to all the arguments against protection of the British dye industry and then promptly enacted, last month, the most drastic sort of legislation to assure absolutely that the German chemical industry would not ruin that of Great Britain. She carried out the understanding that had been reached in Paris. It is more than passing strange, however, that every effort to carry out the same understanding in the United States has been prevented by

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filibusters or threats of filibusters in the Senate. It is amazing, but it is true.

It is a fact that the Germans have not yet yielded up their war method of extracting nitrogen from the air. The methods we have are obsolete, and we know it. But the final Haber process we have not got. It will be got, in one way or another, but it has not yet been got.

The absolutely essential character of the dye industry in relation to national defense is not a question of conjecture or of theory. It has been demonstrated with mathematical accuracy, and it can be so demonstrated at any time, before any committee or any jury. Control of the American dye market by the Germans is not inherently a commercial undertaking at all. Germany can afford to give away dyes in America if by so doing she can destroy the American dye industry. Dyes, with her, is preparedness for war. Dyes, with us, can be nothing else.

We would be safer without a gun factory in the nation, a powder plant or a warship than without a chemical industry and a chemical personnel equal to any others on earth.

Diluting the Soup

There is less employment now than there was six months ago; there may be still less in the coming six months. Now, as ever before, labor leaders advocate a characteristic remedy for the situation. The principle is so sound from the labor theory of economics that it was discussed in the Montreal meeting of the Federation. Briefly, the idea is to reduce the work-day to six hours in order to make a little go further. Mrs. Wiggs of the Cabbage Patch used this same idea in her domestic economy. When unexpected guests came to dinner and there was not enough soup to go around she poured more water into it.

The whole idea of artificial employment is as senseless as this. A bowl of hot water will give no nourishment to a hungry person. Neither will dilution of work put bread on the workingman's table. Wages come from the product of the factory. In order to get more a man must earn more. Spending twelve hours on what should be done in six does not give the worker twice as much work; it merely helps to increase the cost of the product. Indirectly, this would affect every other commodity in the market.

Price reductions are not secured by increasing the period of leisure or so-called rest. Unless producers produce there will not be enough profit to pay wages. Resting does not put shoes on children's feet. There are times when efficiency, willingness and common sense are needed. Not working more hours and doing less, but doing more in the usual time, is the need. "Give and it shall be given unto you," say the Scriptures, "good measure, pressed down and running over." Applied to the labor attitude, that would produce better results than the plan of diluting the soup.

DEATHS

Near Hillsboro, Ill., December 21, Dr. George McGowan, a retired dentist and dental college instructor, aged 45, was killed by being run over by a freight train while walking home on the railroad track. Dr. McGowan was connected with the old Barnes College, at St. Louis for six years.

At Silver City, New Mexico, Dr. Earl Quincy Gast, aged 32.

At Marietta, Pa., Dr. John E. Tierney, aged 33.

At Memphis, Tenn., January 2, Dr. William G. Stoneberger, aged 34, acute indigestion.

At Helena, Mont., Dr. Henry J. Wirth, aged 61. He was very prominent in civic as well as dental affairs in the State.

At Lowell, Mass., December 22, Dr. Albert W. Burnham, aged 81. He was the oldest dentist in Massachusetts.

At Camden, N. J., December 27, Dr. William L. Singley, aged 74.

At Spokane, Wash., December 28, Dr. O. J. Croup, aged 61.

At Hartford, Conn., January 3, Dr. George L. Parmele, aged 72.

At Chicago, January 9, Dr. W. J. Leary, of Kankakee, aged 59.

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TAKING PICTURE OF TOOTH

A prominent young dentist was instantly killed while working with an X-Ray machine at his office in the Laupus building on Chestnut street. He was electrocuted when about forty thousand volts of electricity passed through his body.—*Daily Press.*

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REGULAR CONTRIBUTIONS

THE DENTAL SUMMARY
THE MAGAZINE THAT HELPS

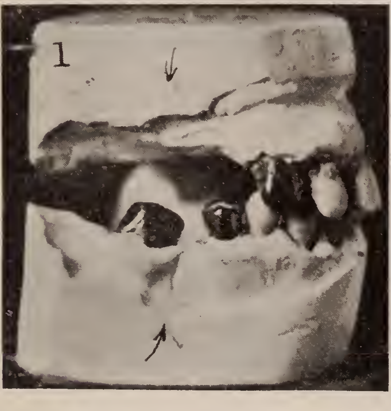
Vol. XLI March 1921 No. 3

PRELIMINARY CONSIDERATIONS IN PARTIAL DENTURE CONSTRUCTION*

BY A. ALFRED NELSON, D.D.S., DETROIT, MICH.

(Continued from THE DENTAL SUMMARY for February)

IN THE STUDY OF THIS SUBJECT it is well to bear in mind that the first requisite to success, both from a *functional* and a *financial* standpoint, is the establishment of a basis of MUTUAL UNDERSTANDING between the operator and the patient. That is, patients should be made to understand, *first*, just what may be expected from partial dentures *practically* and not what the dreamer or "hot-air" artist would lead them to believe they can expect; *second*, what the cost is to be, and *third*, when and where the operator's responsibility ends. From the operator's standpoint it means a clear case of business as to what he is to render the patient in the way of service—and the rendering of that service, as well as a clear understanding as to the financial arrange-



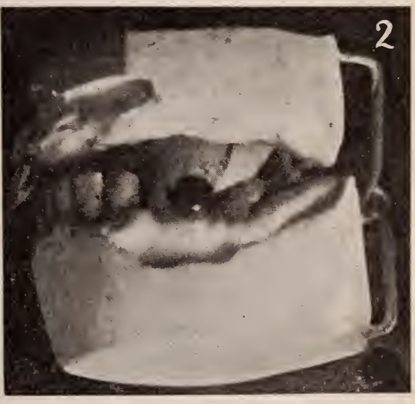


Fig. 1—Right view. Relation of mandible to maxillæ in central occlusion. Note the inclination of the lower teeth.

Fig. 2—Left view. Relation of mandible to maxillæ in central occlusion. Note the overjet and the overbite of the upper teeth.

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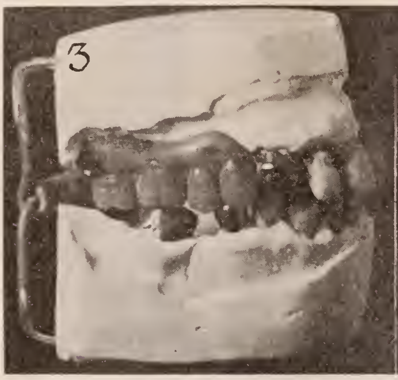
*The second of a series of twelve articles on Partial Denture Construction being written specially for THE DENTAL SUMMARY.

ments. This basis of understanding can only be arrived at by following out a scientific, *truth-telling*, systematic procedure in the consultation and examination of the case.

As a rule, during the first consultation, the usual opening remark that the prospective patient makes has to do with the fee, and, sad to relate, the average reply is usually a "gambler's bid" inflated with air, the operator having no conception of what he is going to construct nor what the mouth conditions of that particular patient are; that is, of the obstacles to be overcome as regards occlusion; health condition of the tissues; size and shape of the ridges; health condition, size and position of the possible abutment teeth, and the possibilities of a successful restoration. The method of procedure usually accompanying such an answer leads but to one goal, and that is that one or the other party to the contract is cheated. In many instances it is a case of obtaining money under false pretenses, though more often it is a loosing proposition for the operator in that he has partaken of a larger mouthful than he can swallow. Yet this method of handling and examining the patient is handed down from generation to generation in and out of college.



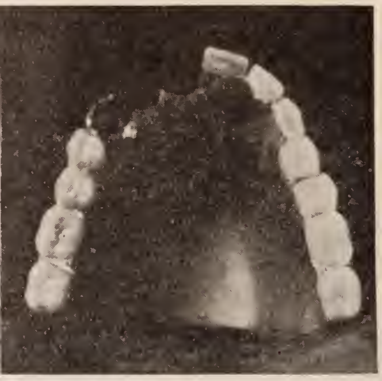
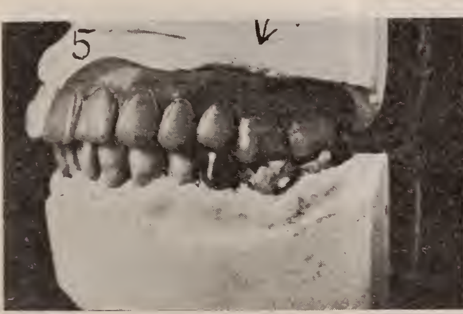


Fig. 3—The partial denture in position and the occlusion on the right side.
Fig. 4—The partial denture constructed for the case.

The true professional man should not perpetuate this antiquated, unfair method of examination by answering with a *stock quotation*, but rather should state the condition of affairs to the patient. The patient should be made to understand that *fees vary according to the requirements of each individual case*, some requiring infinitely more care, attention and diversity of constructive detail than others, and as no two humans are alike, likewise no two mouths. That for this reason it is necessary to make an examination and classification of mouth conditions, as well as the construction of study models of the case, so that the difficulties to be overcome can be better estimated and to assist in outlining a plan of construction. That it often is necessary to take radiographs of the remaining teeth and edentulous spaces so that the underlying substructure may be known to us.

Explained in this manner the patient can readily see that for this service and honest advice the operator is justified in charging a fee based upon the time consumed plus the cost of the radiographs. The patient's estimate of the operator's worth is raised considerably and the gaining of the confidence of the patient in this manner is extremely helpful to a successful completion of the case.



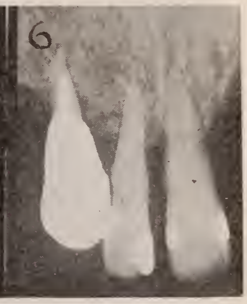


Fig. 5—Partial denture in position and the occlusion on the left side.
Fig. 6—Radiograph of the upper teeth. (The edentulous spaces on either side of the teeth showed no pathological involvement.)

No one would think of going to a physician for advice without paying for it, and likewise no one would expect a contractor to erect a building until he had furnished a report of the soundings of the strata upon which the structure is to rest, as well as plans and specifications for the construction of that dwelling, and for this service he receives pay as an architect. Why not the dentist? The only argument against it is that of a man who is trying to justify his antiquated mode of procedure because, in a given number of cases, he has been a good guesser. Reason favors the proper course of procedure as outlined in brief in the article entitled, "Compensation Between Attachment and Mucosa in Partial Denture Construction," which appeared in the February

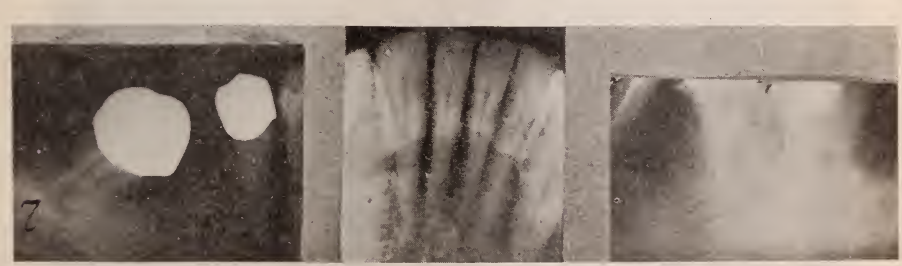
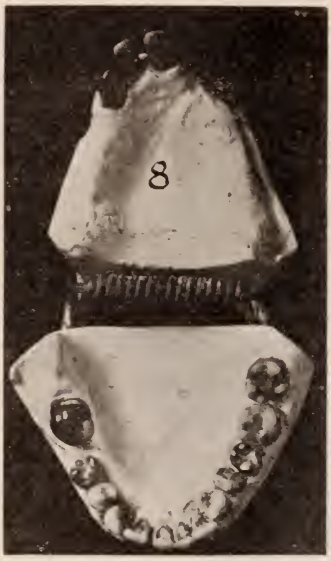


Fig. 7—Radiographs of the lower teeth. Note pathological involvements.

issue of The Dental Summary, particularly that dealing with the examination and classification of the mouth conditions.

To attempt to give a description of the proper mouth examination and classification, as well as the classification of the patient's mental attitude, would be folly on my part, for the reason that an outline of this method of procedure from the pen of Dr. William A. Giffen, of Detroit, Mich., in collaboration with Dr. M. M. House, of Indianapolis, Ind., (and which, by the way, is a masterpiece in its scope) will soon appear in the *Journal of The National Dental Association*, entitled,



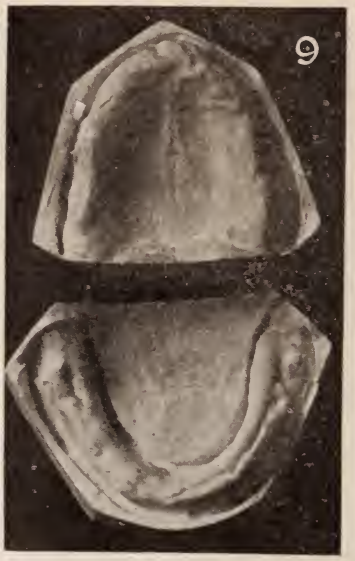
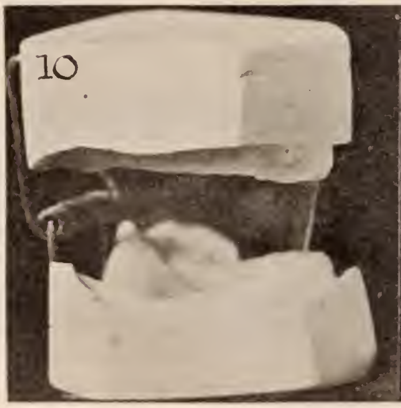


Fig. 8—View of case showing relative size of arches.
Fig. 9—The results of surgical interference ten days after the operation.



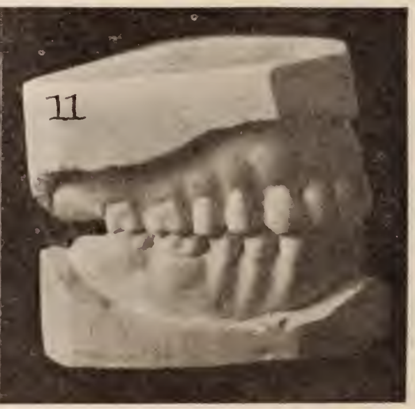
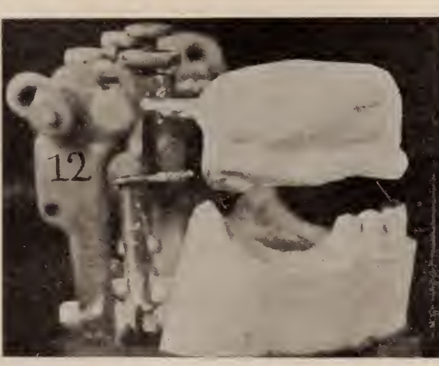


Fig. 10—Side view showing results of surgical interference.
Fig. 11—Casts of the full dentures inserted three weeks after operation.

"Service and Compensation in Denture Construction." Rather than do an injustice to the subject I earnestly refer the reader to a careful and diligent study of this most important article, and especially to Dr. House's classification, for it bears the same relation to partial denture construction as it does to full denture construction.

Having classified and tabulated the mouth conditions as described in Dr. House's classification, preliminary impressions should be made of each and every case, (including the opposing jaw), and the occlusion registered with wax. (Bite). It takes but a few moments and the time spent will yield dividends later. Radiographic examinations of all the teeth and edentulous spaces should be made so that the patient's future



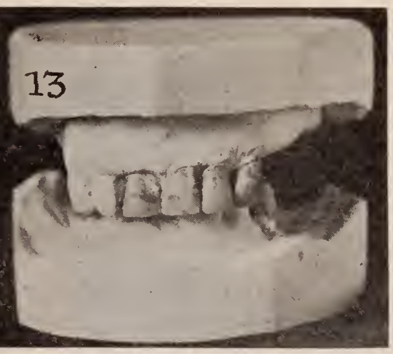


Fig. 12—Edentulous upper, partial lower occluded study model.
Fig. 13—Front view. Relation of mandible to maxillæ in central occlusion. Note the overjet.

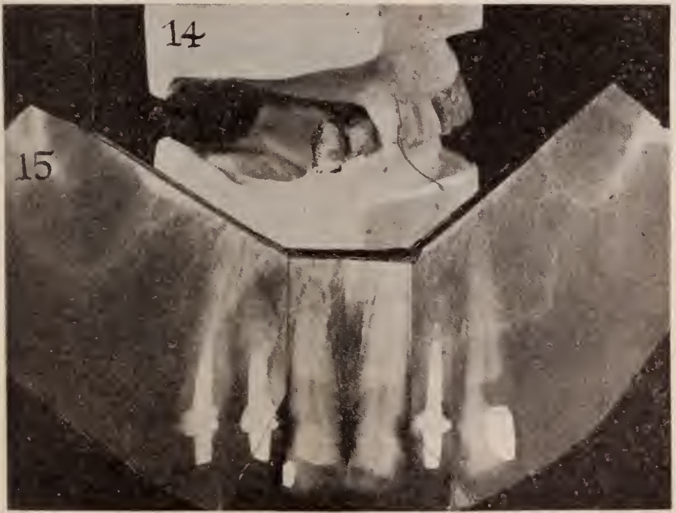


Fig. 14—Right view. Relation of mandible to maxillæ in central occlusion. Note overjet and overbite.
Fig. 15—Radiographs of the upper teeth and edentulous spaces.

health can be protected and insure success of the proposed structure. *Any attempt to construct a partial denture while the health of any root or tooth remains in doubt, or the condition of the underlying osseous structures is unknown, is simply wasted effort, as that structure is preordained to be a failure. Hence the importance of radiographic examinations.*

From these impressions, which can be taken in compound, occluded study models are made of plaster of Paris or artificial stone, (if so desired), and are of extreme importance in that they show up conditions that are not discernible from a visual or digital examination. From the study models, as previously stated, the difficulties to be overcome can be better estimated and can be demonstrated to the patient at the next sitting in a logical and clear manner. The doubtful teeth as revealed by the radiographs can be marked on the study models as well as the osseous condition of the ridges.

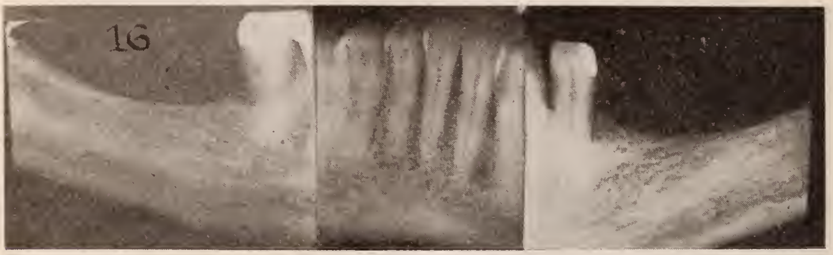


Fig. 16—Radiographs of the lower teeth and edentulous spaces.

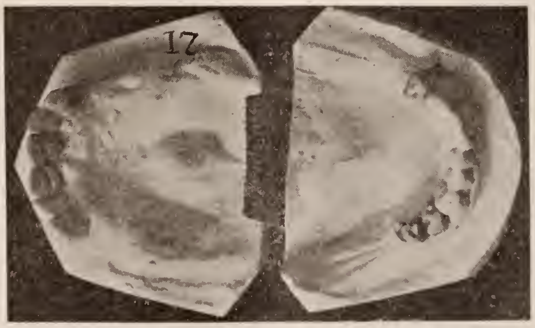


Fig. 17—View of case showing relative size of arches. Note exostosis of max illary symphysis.

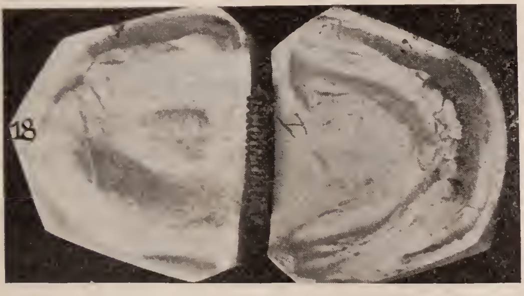
Bear in mind that the average patient has sufficient intelligence and acquaintance with the dictionary to know what you are talking about.

Figs. 1 to 8 show the results of a haphazard examination and the injudicious application of a partial denture to a case which, from a functional and pathological standpoint, required full dentures. From a mechanical standpoint the partial denture constructed for the case was not as bad as the average result of this method of procedure, but from the patient's health standpoint, it was an abomination and a disgrace to dentistry.

Figs. 9 to 11 show casts of what was done for the above-mentioned case, after a proper examination and careful study of the models and radiographs had been made.

Fig. 12 shows the value of occluded study models for those full edentulous upper and partial lower cases, which are frequently met with. In this particular case the important factor brought out by the occluded study models, is the necessity of resorting to surgical interference in the upper arch in the incisor region from an esthetic point of view. The labial plate of the alveolar ridge should be smoothed off.

Figs. 13 to 19 show views of a type of case which, if a hasty examination were made, would lead to sad results and financial loss both to the patient and the operator, and is a type of case frequently presenting for partial denture service. With study models and radiographic findings such as illustrated, it readily can be seen that a partial denture in the upper jaw would be a failure, and that it would be impossible to restore masticatory efficiency, unless alveolectomy is performed and a full upper and partial lower denture inserted.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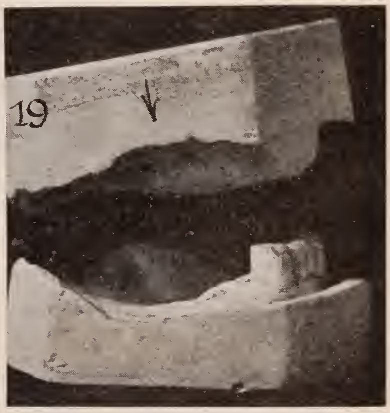
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Fig. 18—Results of surgical interference fourteen days after operation.
Fig. 19—Another view showing results of surgical interference.

The above-mentioned illustrations readily show the folly of hasty examinations. Numerous other cases could be shown, but the above suffice to prove the necessity and value of a proper examination, including radiographs and the construction of occluded study models as an aid to a proper diagnosis and the insurance of a "square deal" to the parties concerned—the operator, and the patient!

213 Chalmers Bldg., corner Parsons & Woodward Ave.

WAX MANIPULATION AND WAX PATTERN MAKING*

BY K. W. KNAPP, D.D.S., DES MOINES, IOWA

THE FIRST IMPORTANT CONSIDERATION for the making of a correct wax pattern is the selection of a proper wax. The hard, high-heat waxes (of which Taggart's is a type) are very rigid at mouth temperature, carve very nicely if manipulated properly, and burn out with very little or no ash residue. They should be warmed in a definite manner, however, and very carefully; or else they have a tendency to flake or become granular. In case a small piece of wax be inadvertently cut off in carving it usually is quite difficult to add fresh wax in the mouth. For the purpose of this technic these waxes are undesirable in that they do not boil out readily owing to their comparatively high melting point.

The medium-heat, medium-hard waxes (of which Kerr's Blue Wax is a type) may be softened without flaking over a low flame, are sufficiently hard at mouth temperature to resist distortion, carve very easily, and yet sharply, and may be added to satisfactorily in the mouth. The lower melting point allows them to be boiled out perfectly without residue.

The low-heat and soft waxes are unfit for use, as they distort very readily and they therefore will not be considered.

After considerable experimentation with different waxes of the first two classes, Kerr's Blue Wax was decided upon as having the greater number of desirable qualities for this particular method. These qualities may, however, be lost utterly with improper manipulation.

A very common method of using this wax is, I find, to hold one end of a stick in a flame until it becomes almost fluid, remove quickly, and repeat the process until it can be manipulated very easily. Treated in this manner, it is granular in appearance as soon as pressure is applied, which will make a rough checked surface on a casting made from it. Besides, the molecules are separated greatly by excessive expansion, with a consequent greater tendency to warpage; and if used without a matrix-band will flow in the direction of least resistance. In the case of a proximo-occlusal cavity, the gingival portion of the pattern will be blurred and rounded with no compression at that point, which will, of course, make a correct casting impossible.

The best results with this wax have been obtained by using a somewhat different technic for a case where the matrix is not used, than for one where it is believed better adaptation may be assured by using a confining band as a matrix. As a general rule it may be stated that the matrix is *not* used in all cases of proximo-occlusal cavities where the approximating tooth is present. Also in mesio-occlusal cavities where free and ample access is had to the gingival seats by reason of the tooth being exceptionally short occluso-gingivally.

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*The second of a series of articles on "Casting Technic" being written exclusively for THE DENTAL SUMMARY.

For purposes of description let us suppose the case as being a disto-occlusal cavity in a lower first molar, the second molar being present.

A fresh stick of Kerr's Blue Wax is held in such a manner that the end alone is passed momentarily into a small gas or alcohol flame; being sure to remove it before it shows the slightest sign of melting. This end is then pressed with the thumb and finger of the left hand to test its softness. This is done again and again until the wax is felt to be quite workable. At this stage it should feel as though it could be readily molded to any form, and yet, when it is bent or pressed, not show any sign of check or crack. When this condition is reached, the softened end is pressed back upon the stick in such a manner that the softened portion spreads out much like a mushroom on its stem. This flattened part is then molded firmly around the harder center portion until a ball about the size of the end of the little finger is formed. During the manipulation it is heated as before, and when completed the ball is pinched off the stick with the thumb-nail. The softened end is now pinched to the shape of a blunt wedge to more readily enter the approximal portion of the cavity, and rubbed slightly in a stroking manner by the left thumb or forefinger. If the warming process has been correctly done this stroking will leave the surface of the wax in a condition whereby it will have the sheen of satin.

The wedge-like end is now started in the distal portion of the cavity, and pressed firmly and steadily with the right forefinger and from the occlusal toward the gingival. The forefinger and thumb of the left hand are held to the buccal and lingual sides of the cavity, and steady pressure maintained by them, the mesial surface of the second molar acting as the fourth wall of a matrix to aid in confining the wax. The hard core in the center of the wax acts as a plunger in forcing the softened point clear down against the gingival seat, so that the wax is actually under compression at that point. The patient is then asked to close tightly, without making chewing motions, as to do so at this time would cause distortion.

The mouth is then opened and pressure bucco-lingually with the left thumb and forefinger applied to correct any change which might have been caused by the spreading of the wax where it was bitten into. The patient is asked to close again, and while the teeth are set, the lips are opened and the wax flooded with water at room temperature. The mouth is again opened, and the whole bulk of wax carefully removed occlusally by lifting with the thumb and finger in a direction parallel with the long axis of the tooth.

This wax bulk is then dropped into a glass of water at room temperature and allowed to remain a few seconds. It is then removed and dried with air from a chip blower and carefully examined. The cavity side of the wax should now show beautifully smooth and with the gingival and occlusal seat imprints flat and clean-cut. The proximal margin of the gingival seat should be clearly marked, and the whole cavity surface appear homogeneous in character, showing practically equal compression in every part. If any portion of the cavity-surface imprint shows a place that seems to have been rubbed or "scuffed," it usually will mean an undercut in the cavity, which should be corrected at once and another pattern made.

One of the chief reasons for using this particular technic is that incorrect cavity preparation may be discovered immediately, and rectified before going through the whole process of casting, only to find that the casting will not seat perfectly. Again, if the gingival seat does not show flat and clean-cut, when you know it should be because you took special pains to cut it that way, and used flat-end stones or burs to do it so, it simply means that the wax was not forced down properly. I firmly believe that most of the so-called shrinkage at the gingival is due not to the shrinkage of the gold, but to the fact that the wax was *never gotten down there* in the first place.

The second reason for removing the wax in bulk is that the gingival margin may be trimmed out of the mouth where it can be seen. This margin is one that, if carved in the mouth, must be done blindly and by the sense of touch alone. It is very easy in trimming this margin in the mouth to let the instrument cut a bit too deeply, and trim off a portion of the wax which should cover the margin. Unless this be noted and corrected, certain leakage and inevitable failure is the result. By having this large bulk of wax as a handle, and by dipping repeatedly in a glass of water at room temperature, the gingival margin can be carved with a sharp lancet so as to remove all overhang and leave just a delicate line of plus wax, which will insure gingival marginal protection. This method of trimming eliminates also the possibility of laceration of the interproximal soft tissues. Also, in removing the wax in bulk, it will be noticed that on the proximal surface of the wax there will be a small oval depression which accurately marks the contact point; and, in trimming away the surplus wax out of the mouth, this point is left intact and the surplus trimmed away from it, thus leaving it as the contact point on the casting. When this surplus and the gingival margin have been trimmed as described, the pattern is carefully replaced in the tooth, pressed to position, and closure made as before to seat it perfectly.

The surplus wax on the occlusal is now trimmed away by using cold, flat-bladed instruments, allowing the blade to rest on the planes of the cusps as guides to avoid cutting inside margins and thus cause discrepancy. We can then approach the buccal-lingual margins with a great deal of caution, trimming carefully, and at all times placing the blades in such a position that they must slide on the buccal-lingual surface of the tooth before cutting the wax.

In this way these margins may be trimmed safely and without danger of cutting inside the margins. Also, in following this rule, it will be found after the trimming is completed, that the necessary fullness for correct contour has been left on the wax pattern. In using these flat-blade instruments on all margins, the back of the blade is kept somewhat in advance of the cutting edge which gives the effect of burnishing the wax tightly to the margin as it is trimmed.

The use of hot instruments is contraindicated at all times, as it produces the thing we are trying to avoid, that is, an expanded wax with molecular disarrangement just at the point where the wax is thinnest; with a consequent greater chance for warpage. When the margins are all trimmed, the occlusal surface is carved in detail. It is right at this point that the operator may express his individuality, so that in after years he can look into a mouth with restorations made by many men and say positively; "This is mine" and "That is mine."

We all have or can cultivate a more or less correct idea of tooth form. Triangular and marginal ridges, grooves, cusps and sulci were all planned by the Creator for a definite purpose. To place uncarved or improperly-carved restorations is to defeat that purpose. It seems to me it is up to us to demonstrate that we are sculptors and artists, and not simply workmen and artisans.

We should carve more from models. It is no disgrace to use a skull or some other device showing correct occlusal markings to pattern our inlays after, any more than it is for a sculptor or artist to have *his* models. In fact the sculptor wouldn't even attempt to work without one.

Occlusal surfaces are made too broad in at least fifty per cent. of the cases. It is well to keep in mind the measurement that Dr. Prime and others have pointed out. If we carve our occlusal surfaces so that the width from the tips of the mesio-buccal to mesio-lingual cusps is half the width of the tooth at the widest point, it is a certainty that much extra stress will be avoided, and the little spill-ways at the mesial and distal portions of the marginal ridges, and proper height of the marginal ridges themselves, will be preserved.

Again I should like to urge the importance of individual technic in the laboratory at least once a week to every man who is making cast restorations. These first two steps, cavity preparation and wax pattern-making, always will vary with the individual. As he puts himself and his individuality into these, so will he be proud or ashamed of his results. The other steps are perhaps just as important but they are mechanical; these two are the expression of ideals.

The carving completed, the patient is asked to close and then move the jaw carefully from side to side. If further trimming be necessary it is done, and the surface smoothed by burnishing lightly with a strip of wash-satin held over the finger tip. *Oil of cajeput never should be used, as it is a solvent and makes a mushy surface and a softened margin which may distort.* The pattern is again flooded with water at room temperature, the point of a hooked explorer inserted in the occlusal surface at a point which is the center of balance, and carefully removed. The pattern having been removed before carving will come away easily. It should then be mounted, as will be described later, and invested immediately.

It is noted that stress is placed upon the use of water at room temperature. This implies water at approximately seventy degrees Fahrenheit. Any material when chilled has a tendency to contract, and therefore if water at sixty degrees Fahrenheit or colder is used to chill the wax pattern, I can see no reason why the pattern would not contract mesio-distally and bucco-lingually, and bring the margins out of contact with their respective walls. Also, the tendency in a mesio-disto-occlusal pattern would be to contract mesio-distally along the occlusal step; and, since the axial walls would resist contraction of the whole mass in a straight line, the tendency would be to tip the gingival margins outward. In this case the force employed would be as the action of a lever; the contraction of the occlusal step portion being the power; the line angles at the junction of occlusal seat to axial walls, the fulcrum, and the mesial and distal extensions of the wax pattern being the arms; the gingival extremities of which would be forced away from contact with the gingival margins of the cavity. If warm water be used the tendency is toward expansion, and also almost certain warpage when the pattern is removed. Now, the open-mouth temperature has been estimated at about eighty degrees Fahrenheit, and as the wax is sufficiently hard at room temperature it would seem that the safest procedure would be to use seventy-degree Fahrenheit water, thus insuring a minimum of contraction or expansion consistent with sufficient hardness of the wax for safe removal. Dr. Price and others have demonstrated that if wax be warmed and forced into a cavity under pressure, the tendency of that wax is to return to its original form when the pressure is removed and the temperature raised. Therefore, the wax is pressed into the cavity and set under pressure by flooding with the seventy-degree Fahrenheit water, and then it is kept as nearly as possible at that temperature during the carving and manipulation, to avoid distortion by a raise of temperature when the pressure is removed. This is done by frequent application of the seventy-degree water.

The use of hot instruments plunged into the wax after it has been forced into place has been advocated by some writers for the purpose of releasing the tension. I have considered this inadvisable as the wax in the heated portion is expanded with an entirely different molecular arrangement, and a tendency toward greater contraction than the unheated portion of the wax when the pattern is chilled for removal. In short, it would seem the more logical thing to do would be to set the wax at a certain safe temperature until it is safely invested. I have tried various higher temperatures for the purpose of expanding the wax to compensate for shrinkage, but with indifferent success; due, I believe, to the fact that the expansion is unequal in all directions due to difference in the bulk of the wax in different portions of the pattern.

It has seemed necessary to go into this part of the technic in rather minute detail, for the reason that I believe many cases of misfit castings are due to faulty treatment of the wax pattern; causing warpage and certain failure to fit even before it was invested.

In the case of a mesio-occluso-distal cavity in a lower first molar or a similar case, unquestionably better results will be gotten with the aid of a confining band as a matrix. A strip of thirty-six-gauge copper matrix material is cut sufficiently long to encircle the tooth and leave a surplus of about a half-inch at each end. The width should be approximately the height of the top of the cusps from the gum line. This strip is bent to a U-shape, and, holding the ends between the right thumb and forefinger, is inserted from the buccal, hooking the bend over the lingual surface of the tooth. The thumb and finger are then slipped up toward the buccal and pinched together to crimp the band so that it will completely encircle the tooth a trifle loosely. The curves of the gingival tissues are closely noted and the gingival portion of the band trimmed with small curved scissors to conform to their outline. The band is then replaced and, by having the patient close lightly, the occlusal height is determined and this edge trimmed until the jaw may be closed and moved from side to side without striking. The point of an amalgam packing instrument is then passed into the mesial and distal portions of the cavity and the band pressed tightly against the approximating teeth. In other words the band is contoured to allow full tooth form.

The band is then lightly vasalined on the inside and put aside. The wax stick is then warmed much as before, except that in this case an effort is made to have it equally soft throughout, as the band will confine it and allow for compression. When a ball sufficiently large to practically fill the band has been correctly warmed, the band is picked up between the thumb and the second finger of the right hand with the extremities of their respective nails held at the crimp mesially and distally. The softened ball of wax is pushed into the band from the gingival side, and then rewarmed by passing this gingival surface over the flame quickly once or twice. It is then inserted into the mouth and placed to position over the tooth with the buccal portion of the band over the buccal surface of the tooth as a guide. When in correct position, the tip of the forefinger of the left hand is held over the occlusal surface of the wax and firm, steady pressure applied.

When the cusps of the tooth begin to be felt under the finger tip it is removed, and the patient asked to close firmly and move the jaw from side to side as in chewing. During this time, of course, the right thumb and finger must maintain a firm grip on the ends of the band to confine it closely to the tooth walls. And at this stage it is well to take a fresh hold on the ends and by moving up just a little toward the tooth and pinching firmly together, the wax is compressed just a little more closely to the margins at the mesial and distal.

It is remarkable how easy it becomes with a little practice to "feel" just what the wax is doing. It is for just this reason that the band is held by the finger tips and not a matrix retainer. In some cases it is very difficult to hold the band correctly with the fingers and in those cases a metal retainer is used. I prefer the Wagner or Kerr's Onderdonk for this purpose. They are used with practically the same technic.

When the wax is correctly conformed, it is set under pressure with water as before, and the whole mass removed carefully and dropped into the glass of water. The band is then peeled off, and the wax bulk dried and thoroughly examined as before. If it shows sharp and clean-cut, the gingival margins are trimmed with the lancet out of the mouth, and the whole replaced and reseated as above outlined. The same applies to further trimming, carving and smoothing.

Where a matrix band is used, of course, contact points must be added, and this is done by drying the pattern after removal and carefully adding small portions of melted wax to the proper position. Care should be taken not to warm a large area of wax in doing this, as again distortion must be avoided.

A matrix also is used in all cases of three-quarter and full cast restorations with identical technic except in the anterior three-quarter cases. Here, it must be remembered, we have grooves inclining slightly to the lingual and when the wax is forced to place it flows over the labial surface. If we attempt to remove the wax and band together as in all other cases, the wax impression of the retaining grooves would be distorted or broken off.

In these cases the band is opened up and slipped slightly to the lingual and then removed incisally. Next free the labial surface of wax and the pattern can then be removed without difficulty. After carving completely, it is sometimes a problem just how to remove an especially delicate anterior three-quarter pattern. I have obtained best results by using two fine hooked-point explorers. Place one hook on the mesial contact point and the other on the distal, and by using one in each hand, the pattern can be teased off by employing gentle, simultaneous traction.

It is the sincere hope of the author that this technic be given thorough and serious consideration and trial, for the reason that it is the result of a series of experiments with many different methods of working wax and making patterns, both in the mouth and on technic models.

So far it has given the most uniform and accurate results and is advocated for that reason only. Other waxes may be used, of course, but in using them one should give due study to their peculiar properties, and make such variations in technic as are necessary to take full advantage of those properties.

Utica Bldg.

CROWN AND BRIDGE-WORK*

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THE WRITER has no excuse to offer in defense of this series of articles on a subject that is at this time receiving a great deal of adverse criticism if not actual condemnation. However, he invites any constructive criticism that his readers may offer from time to time, and shall endeavor to give them inpartial discussion.

Bridge-work as an art dates back to the early centuries. Evidence of this class of work has been gathered to show that this form of restorative dentistry did exist as early as 400 to 500 years B. C. The appliances then used were of the simplest form and very primitive, consisting of gold bands around the abutment and pier teeth, supplying the missing teeth with carvings from ivory and similar materials. The historian Guerin states that some of these early efforts at bridge specimens may be seen in the museums of Rome and Athens.

There was very little or nor real progress made in this art until the beginning of the eighteenth century. However, crown and bridge-work as we know it at present was not practiced to any extent prior to 1870. At that time, Dr. Beers, with the assistance of Dr. Richmond, laid the foundations of the system of bridge-work that held the profession and public in its golden grip until 1910. This grip may not be as firm at present as it has been in the past; however, it will continue to influence crown-and-bridge thought for some time to come, for it is needless to say, that both the profession and public are very willing to be held captive in its golden embrace.

A great deal of helpful light recently has been thrown upon this system, revealing many weaknesses and flaws in it, and some conditions that no self-respecting professional man could countenance, and remain true to himself. The radiographic survey of this system of practice will be helpful to a degree, but should not be considered the last word by any means. Shadow pictures are only shadows at their best. Unfortunately they frequently picture a condition that is anything but the truth. However, some difficulties that are thus revealed could be overcome by an improvement in the technic of construction and application. But, unfortunately, this feature of the work involves only a part of the field; the remaining problems are the most difficult to solve. At this time the difficulties in the technic of construction have resolved themselves into a question of which of the several so-called systems shall we follow or use, regardless of the physics or dynamics involved in the case.

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*The first of a series of articles on Crown and Bridge-work being written exclusively for THE DENTAL SUMMARY.

In the past, and even into the present, crown and bridge-work has been largely mechanical in application and practice. Our thought ever has been that of supplying the lost units of the arches without any evident regard for the laws of function and anatomical requirements. The operator's aim and goal was that of closing up the spaces without a gross violation of the esthetics demanded by the position of the bridge and the occlusion it would have to meet. However, a kindly word for the operator at this time will not be amiss. It must not be forgotten that the conditions surrounding the case and the foundation upon which he was asked to rear a superstructure were not of his own choosing. True, he had the privilege of rejecting the case and refusing to perform the bridging operation until conditions were to his liking, if such a thing were possible. However, we must not forget, that the very condition which calls for a crown or bridge does not improve with waiting, but becomes more and more difficult with every week of postponement. A series of pathological conditions may develop and become chronic to a degree that would make such an injury, due to this neglect, quite permanent.

In the training of the student and in the thought of the practitioner, the subject dealing with the physiological function of the teeth, their contours and investing tissues, has been sadly neglected. However, I would not go to the length that Dr. R. Ottolengui does and say that bridge workers who are merely mechanics should no longer be permitted to practice. The question of what shall constitute real crown-and-bridge service is easily a debatable one. Very much can be said for and against either side of it. It is also well to remember that our present-day methods in removable work are far too embryonic in character for us to parade them as standards.

Should there be a classification of crown and bridge-work on the basis of the rich and poor patients? Should we practice a different system for the middle class? Or, is it really possible to meet the crown-and-bridge needs of these three divisions of society with the same system? Is there any justification for making a fixed bridge with a crown at each end for abutment, or may we assume that such a method is now obsolete?

How shall we organize and put over an educational program for both practitioner and patient, to help each to see the real values in crown and bridge-work? The public at present is very much in favor of fixed bridge-work. They are, to some extent, familiar with its shortcomings, but are not willing to lay it aside for something new but unproven. To explain to the majority of our patients the physics that are involved in each class of bridge-work would be analogous to the tale of "water on a duck's back." It is equally difficult to talk with the majority of our patients about tooth movement and its physiology. These functions to their mind are matters far too small for them to consider. What they want is something that will masticate with the least effort and attention on their part.

The practitioner is at present in a crown-and-bridge imbroglio. He does not know which horn of the dilemma to grasp; both are hedged about with many embarrassing conditions. He makes his appeal to the leaders and teachers with a hope that they may give him a foundation upon which to stand or help him to loosen the Gordian-knot that seems to hold him. But, they are more or less at sea themselves. I think I can hear some one say: "Why use any bridge-work at all when partial dentures may be used in any case where two or more units of the arch are to be supplied?" When such thoughts arise in your mind consult the patient and see what a *crux pons asinorum* you have on hand.

In presenting this series of articles on this branch of practice, I do not expect to lose the *dignus vindice noduce*, for I am only a small unit in our organization. But I shall try and marshal the several units of value in a helpful manner that will not offend a kindly and considerate nature. However, we must not forget that every case of crown and bridge-work, either fixed or removable, is not one of our own selection, but a condition forced upon us by a violation of some of nature's laws by patient or practitioner, or a neglect of her rightful demands.

It would be unprofessional to classify bridge-work on the basis of finance. It is unfair and unprofessional to make a removable, boilable bridge for one patient because he is a bank director or manufacturer who is abundantly able to pay, and refuse to make a similar one for the minister of the Gospel or college professor because he does not even possess a bank account and is unable to pay the fee. Are the minister and professor less appreciative and worthy than the bank official? Is the minister's physical resistance higher than that of the man of wealth, so that he can live and thrive with less masticating units than his wealthy fellows? Most assuredly, No! Yet the minister and professor are sent to the exodontist because they cannot afford to have the crown and bridge-work done, and the dentist cannot afford to lower the standards of technic or fee as they exist today. With each change in practice came an added technic and cost of time and money to the practitioner. He has watched these changes with an aching and heavy heart, because they widen the gulf that is rapidly separating his patients into two classes.

Let us consider the earmarks of removable bridge-work and partial denture work. Is there a man who can draw a line of demarcation between these two systems of restorative dentistry? Is it possible to develop a technic or system for the one that does not apply to a large extent to the other? Would the principles involved in the application of the one, have no bearings upon the other? Is a clasp-anchored partial denture of gold construction a removable bridge, or is it just an ordinary partial denture? Would not such a partial denture fulfill many of the features commonly attributed to that distinctive class known as "removable work?"

What distinctive features should every piece of removable bridgework possess?

First, it must be designed, constructed and adjusted in a manner that will not offend the remaining units of mastication or their associated physiological functions.

Second, it must fulfill to the greatest possible degree the esthetic requirements of each case and so harmonize with its surroundings that it will not attract undue attention unto itself.

Third, it must be constructed in the simplest and yet strongest manner to insure a maximum service to the patient at a minimum inconvenience.

Fourth, the bridge itself should function with its opposing masticating units without any unusual wear or strain upon such units. This would necessitate the normal interlocking of cusps and the apposition of both the active and passive inclined planes in as perfect a manner as tooth positions and the movements of the mandible will permit.

Fifth, the foundation work of such appliances should be extended into areas that will offer as much resistance against direct and indirect stress as it is possible to obtain. The inclined planes both active and passive should be posed in a manner that will admit of the free movement and function of the mandible without any unusual strain upon the cusps of the several units of the bridge.

Sixth, the several units of the bridge and their surrounding parts should resemble as closely as possible the lost organs or units. The frictional appliances, either simple or complex, should be placed in as secluded a position, consistent with their function, as is possible for the case.

Seventh, the detailed construction of the bridge and its retainers, either internal or surface, should offer the least amount of difficulties toward keeping either or both in a hygienic condition.

Eighth, the appliance or bridge should not provoke certain neurotic manifestations or conditions, or aggravate those with which the patient is already afflicted.

Our present modes of living and the pursuits we must engage in to provide that living are producing an ever-increasing number of neurasthenics and nervous people of lesser degree. Any appliance in the mouth of such people that would keep them conscious of its presence and aggravate the nervous affliction is contraindicated.

This past week a young woman who is head of a department in one of our largest department stores made the following demand: "Doctor, I must have those two spaces filled, but whatever is done, they must not move to such a degree that I will be conscious of it. Such a bridge would drive me crazy." It is a sad commentary on life, I am sure; but the demands upon the nervous energy of our Nation are here, and we, as dentists, must do as little along the path of aggravation as is possible if we hope to claim success for this branch of our work.

These few brief remarks concerning some of the features every removable appliance should have, can also be applied to partial denture work. Either class of appliances serves the same functions. Theoretically, the one may be more desirable from either operator's or patient's standpoint, but, practically, there is very little real difference. Both should provide against the early disintegration and loosening of the abutment and supporting teeth. They should restore the masticating apparatus and its associated parts to as near normal function as possible without unusual pressure upon the ridge under the saddle.

THE FOUNDATION

Every bridge of the removable class has a double foundation, namely, the ridge and the internal parts of the anchors. The former is usually of a yielding character and more or less undependable. The internal parts of the anchors are a part of one or more of the associated teeth which do not move and function with the yielding tissue that covers the ridge. The teeth move in function as single units and any appliance that calls for the support of two or more teeth must be constructed in a manner that will limit to the least degree, such individual movements. It may be well to remember that certain teeth on one side of each arch have movements common to both sides, and the partial binding or limiting of such movements is not to be regarded harmful or destructive. The mesio-distal movement of any of the molars or bicuspids is negligible, because the natural contact of each tooth in the arch limits such a movement. The rotary or torsion movement of these teeth is of little value as far as function is concerned. The health of the tissues surrounding a tooth and the peridental membrane does not depend upon these two movements of the tooth. A careful study of the facet worn upon the approximal surface of a molar or bicuspid will quickly convince the observer that it is perfectly flat in every direction. If this rotary movement existed to any degree, it would manifest itself by giving us a convex facet upon these surfaces of the tooth at the point of contact. The remaining movements that a molar or bicuspid may enjoy during function are not restricted by our present types of removable bridges or partial dentures; hence, the wail about the limitation of tooth functional movements need not concern us in the least.

The two forms of retention now largely used to anchor our bridgework depend upon either the internal or external grip. These attachments that are confined within the bounds of a crown, Carmichael, Kennedy, or inlay, are classed as those of the internal retention, while the stop-clasp, the crib and kindred appliances are known as the external anchor. Any of these will admit of such movements as the tooth itself may allow. If there is more play than the detail of construction permits, there will be an injury done to the tooth carrying such an anchor, thus impairing the bridge foundation to that degree.

The bony ridge and its overlying area of mucous and sub-mucous tissue is always the questionable element in our removable bridges that depend upon saddles for a part of their support. The underlying osseous structures that are usually involved are those that gave support to the missing teeth; namely, the alveolar crest of the maxilla or mandible. When such teeth have been removed, the alveolus is resorbed to a large extent, if not entirely. Such resorption after extraction is entirely physiological in its nature. When resorption follows the progress of diseases or injury, it is both physiological and pathological; however, the results are similar but more extensive. This resorption from either cause may be hastened by the application of gentle pressure in the presence of chemical and thermal irritation. However, some cases do not even need this gentle pressure to remove the alveolus, the resorption taking place in spite of everything we can do.

It is also a recognized scientific fact that the osseous structure made up of the Haversian system will resorb under either constant or intermittent gentle pressure. A very common and quite general manifestation of this truth may be had from the people who wear the "Sure-on" nose grip eye glasses. The writer wore such glasses for four or five years and then laid them aside, but the two depressions in the nasal bones are still there, and, no doubt, will remain there, for he has not yet developed the technic of scientific stimulation of some of the internal secretory glands that influence the deposit of bone in selected areas. If he did know, he would also want to know the exact method of retarding or checking such deposits in order to prevent the growth of an abnormal nose, or what not. The Haversian system supporting the alveolus is no different from that found in other osseous parts of our bodies. Spot saddles or even larger saddles will imbed themselves in the ridges on which they rest, unless the teeth that also enter into the support of the bridge carry a major portion of the load. It is a recognized fact that most of our removable bridges that have only saddle support, and our partial dentures, rest upon a questionable, unreliable and changeable foundation. Provisions that will care for these changes and correct the evil tendencies should be made at the time that the appliances are constructed and placed.

Knowing that the teeth which are intimately associated with our appliance will have to assume the major part of the load, we must give them a careful examination to determine the amount of additional work they may perform. Any tooth that has had, or is at the present time suffering from periodontoclasia, never should be considered a fit member of the bridge foundation. The skiagraph may show very little or no radiolucent areas, thus encouraging the operator to use the tooth or teeth for a part of his foundation. The writer is convinced that such a procedure is certainly inviting trouble, if not a positive step toward malpractice.

The use of pulpless teeth for a part of our foundation will be admissable, providing the canal has been filled and there is no evidence, clinically or radiographically of trouble at the apical area, and that such a tooth will not be overburdened with the new load that is to be placed upon it.

The teeth that are suffering from lateral abscesses or other pathological conditions should also be very carefully considered before any use of them is planned. A clinical and radiographic study of the entire foundation should be made before plans for any appliance can even be considered. The next step in the work is a careful study of the amount and direction of stress the appliance will be subjected to. This will be our next study.

Sixteenth and Los Angeles.

CASTING A RICHMOND, USING STEELE'S FACING

BY JOSEPH HOMER, D.D.S., BOSTON, MASS.

Grind facing and backing to fit root-end in front, sloping up to form a clearance of a thirty-second of an inch in the back. The pin should be about one-sixteenth of an inch longer than canal, serrated on and beveled from facing on projecting end. Oil end of root, mold inlay wax over same and melt to end of pin. Melt an appropriate amount of inlay wax to backing, oil gingival end of facing and heat same enough to soften inlay wax on root when both are forced to place. The wax on root may be softened with spatula immediately before forcing facing and backing to adjustment. Unite two portions of wax with hot spatula, chill, remove and carve wax; remove facing, invest and cast.

87 Milk street.

DENTURE CONSTRUCTION*

BY DAYTON DUNBAR CAMPBELL, D.D.S., KANSAS CITY, MO.

(Continued from page 137, February DENTAL SUMMARY)

(*Fig. 10*). One of the most valuable aids in the construction of dentures is the proper kind of bite-plate for securing central occlusion. "Central occlusion" is a phrase which has been recently adopted, and I feel that it is an accurate one and should be universally accepted. The bases are made of Graft's, or Dentsply, or Alston's base plate, or of any kind which, if accidentally dropped upon the floor, will not break. A sheet of this material is warmed over the flame and adapted to the cast and finished as smoothly as possible. In constructing the lower, a 14-gauge iron wire strengthener is heated and pressed into place just below the ridge on the lingual side, low enough so as to avoid interfering with the subsequent set up.

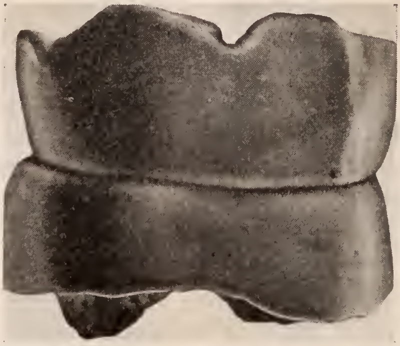

Fig. 10—Occlusion models ready to be placed in the mouth.

We always make these bases as smooth as they can be, using the chip blower and sandpaper if necessary, to smooth them up. Always make them large enough, because it is easier to cut off the bases than to add to them while at the chair. Our method of securing "central occlusion" includes at the same time selection of the teeth. Be sure when your patient returns, that he is accompanied by mother or father, sister or brother, because we are going to select the teeth, and we want someone there who will be an ally when the patient wears the dentures home.

Some preparation containing gum tragacanth, gum acacia, or gum "Corega" is sprinkled upon the upper before it is put in the mouth. No base that is adapted with the fingers to the surface of the cast can fit as well as one molded during the process of vulcanization, but psychologically it is not wise to permit the trial base to become dislodged during the trying-in processes. While unjustifiable expectations should never be encouraged, neither should the prosthetist have any part in arousing unwarranted fears. Accordingly, I always sprinkle some of the sticky preparation in the trial base; then the patient will not look forward with doubts about the finished denture, or with fears that it may be too easily displaced. Place the upper in position.

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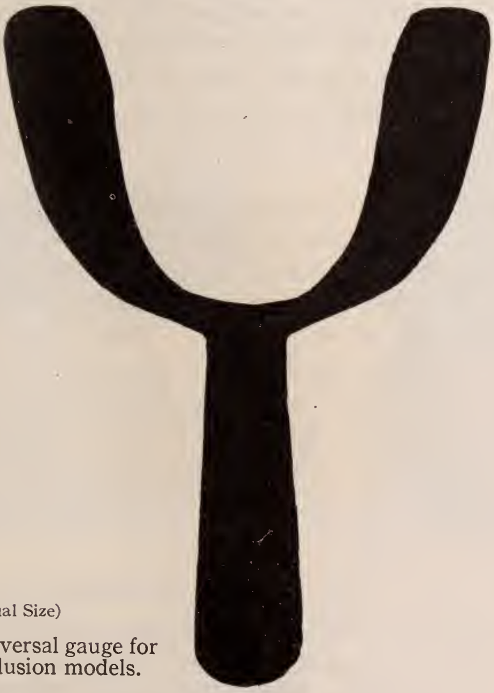
*An illustrated lecture given before the Ohio State Dental Society, December, 1920.

Dentists often allow the patient to shift too much of the responsibility for successful dentures. Fifty per cent. of the responsibility, or the part involved in the construction of the denture, belongs to the dentist, while the balance, the adaptive part, belongs to the patient.



(Actual Size)

Fig. 11—Universal gauge for occlusion models.

Patients will say, "Doctor, fix my mouth so I won't have it drooping at the corners." Sometimes it is possible to improve that condition, but dentists have tried to do too much of that when it is an impossibility. With the patient looking in a mirror, grasp the tissue in the temporal region with your palms and raise the loose tissue of cheek and neck, and you may thus show that what is needed to remove crow's feet and wrinkles is an operation more than a denture. This operation is simple, and in the larger cities surgeons who perform it are associated with beauty specialists. A small slit is made above the hair line, and a portion of the skin tissue is taken out on each side which results in a lifting of the tissues of the cheek and neck.

The universal base-plate gauge is in my office an indispensable aid. (*Fig. 11*). I got this idea from Dr. Gysi, of Zurich, Switzerland. I never knew any one who could explain things as clearly as he can. A few years ago while in his class in New York, at the time we were constructing our occlusion models or bite plates he would apply something like this to the lower, and then to the upper to indicate the shape of the wax. You can make this gauge in different shapes, but personally this answers our purpose best. The idea is that you conform the wax rim of the lower to this gauge and then conform your upper to it also. "Things that are equal to the same thing are equal to each other;" and you will find when they are placed in the mouth that they will assume a more direct apposition.

Will any one tell me why we should not set up the six anterior teeth before we secure central occlusion? To me this seems the most logical time. One reason why more dentists do not have greater success with esthetics in their work is that they do not do enough trial work. This is one of the most opportune times to have five or six sets of teeth and put them one after the other in position, and try them and see how you will like the effect.

If a patient insists upon having "pretty little white teeth" I may remark: "You may know what you want, but you don't know what you need." I use the Trubyte teeth, because I think they are the finest creations in the tooth line ever given to dentistry. You will try Trubyte No. 1, and say, "That is too white?" "Yes," the patient admits. Then try No. 25. "That is too dark." "Yes, that is too dark." Then I select the shade that I have previously judged as best suited for the case and the patient readily agrees. I use only five shades of teeth, Nos. 14, 15, 16, 20 and 22. They answer practically all of my purposes. Many will take No. 14 central, lateral No. 15, then a No. 16 cuspid, and then the posteriors Nos. 14 or 16. This combination often yields very gratifying results.

When the base plate is first placed in the mouth we get the lip line, and then the median line, and then cut out a place for a central. A very valuable suggestion appeared a number of years ago in an article by Dr. Taggart, of Chicago. As a result of his suggestion, before we attempt to set up the teeth we direct the flame of the chip blower against each one and melt and blow the black carding wax away from the pins. After melting some of the pink wax around the pins the tooth is put in position and then sealed with a sizzling hot spatula. If properly sealed there will be no danger of the teeth falling off as they often do when this black wax has not been thoroughly removed. We continue until we have set up the six anterior teeth. (*Fig. 12*). Put them in the patient's mouth; he walks to the mirror, and you walk behind him. He will draw his lips back in an unnatural smile or grimace and if you do the same thing, he will perceive the unnatural effect, and will finally give an expression that is akin to normal. Get the *Saturday Evening Post*, for instance, and turn to some full page advertisement, (I suggest one of these full page advertisements because they are usually in big print, and do not have big words to embarrass the reader) and say, "Read that," and he reads a sentence or two. You note the relationship of teeth and lips and are ready to adjust them to meet the requirements of the case. You will find sometimes that the teeth are apparently too long. Experience teaches that after wearing dentures for some time the lips and cheeks will adjust themselves, and when this takes place the teeth will not then appear too long.

Dr. Monson, of St. Paul, has taught us a number of valuable things, especially with reference to opening the bite; he has taught us that we haven't been opening our bites enough. I don't refer to opening the bite while the case is on the articulator, because this should be avoided. But when the patient closes in coming to central occlusion he should not be permitted to bring the jaws as close together as we have been accustomed to encourage. The lips are very mobile, and if you will say, "Let me make the teeth long enough, because we can always shorten them, and if you return within six months and want them shortened, I will re-set them and never ask a question," I believe results will be more satisfying. Not in a single instance have I been asked to re-set them because they were too long. When you return home observe the patients for whom you have constructed dentures and you will find that in nine out of ten the teeth are too short.

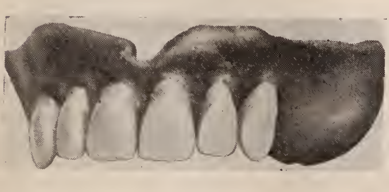


Fig. 12

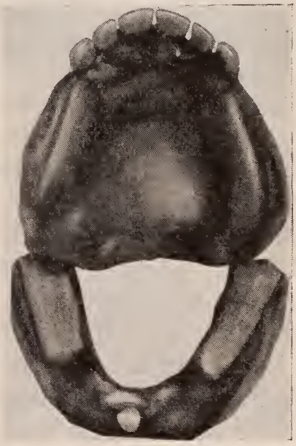


Fig. 13

Fig. 12—The six anterior teeth aligned preliminary to taking the bite and for the patient's inspection.

Fig. 13—Occlusion rims just before the lower is pooled, immediately preparatory to registering central occlusion.

The upper occlusion model carrying the six anteriors is now removed, and the lower is placed in position, while the lip and median lines are marked; it is then removed.

(*Fig. 13*). The wax of the upper occlusion rim is cut so that the portion to be occupied by the bicuspids and molars slopes to a narrower width at the occlusal surface. This tends to give this portion of the upper a kind of blunt wedge effect so that when the jaws close it easily penetrates the softened wax of the lower. Cut out the anterior portion of wax on the lower from the bicuspid on one side to the bicuspid on the other, and then, to mark the height of the lip line, place one tooth in or near the median line and seal it securely.

The patient never should be told that you are preparing to "take the bite." The mere mention of that is poor psychology. Why is it poor psychology? When you hear the word "gnaw," what is your reaction? What movement do you have in mind when you hear the word "chew?" Bringing the molars together. What movement of the jaw is suggested to you by the command, "bite?" You think of using the incisors. The mandible is very tractable and will be inclined to follow any course towards which it may be directed by its sense of touch. If you will take out the landing-place in front, you will aid very materially in securing central occlusion; securing it is one of the easiest tasks provided you make proper preparation.

Further prepare the lower occlusion rim (*Fig. 13*), by taking a sizzling hot spatula and running it through the wax along the bicuspid and molar region on both sides; push the spatula to place on one side, and throw out the first bit of melted wax. Treat the other side in like manner. Then heat the spatula hot, and see how close to the border you can bring it without breaking the outer edge which serves to retain the melted wax. When it congeals but is still soft, place it in the patient's mouth; then the operator should snap his own teeth together and the patient imitating will close his mouth, and when the mouth is closed this upper V-shaped portion of the upper, which has been chilled, will sink itself into the soft portion of the lower. The central incisor which is to serve as a stop will finally touch the upper occlusion rim at a point near the gingival border of the central incisors. When this point is reached the jaws are in correct apposition and the tooth has served its purpose as a stop. When the patient closes, he may bring the jaws together without following the suggestion you have given through snapping your teeth together and also without obtaining the desired relationship. If this happens, say, "That's fine." Then say, "I wonder if you could close that way again." He tries again, and you say, "That's right;" you ask him to close once more, and the result may be a movement just as much too far on the other side. If the dentist will continue in this way without any display of impatience the patient will presently close correctly. Remember, that from the psychologist's standpoint, in attempting to secure this natural relationship, anything that the patient does is acceptable since it is part of that patient's reaction in the series which finally establishes correct central occlusion. If the patient were not *making an effort* to perform the *proper* closing movement, he would respond instinctively with the correct movement immediately upon getting a sensation from the touching of the posterior portions of the two occlusion rims.

After the wax has been allowed to cool for a moment or two the upper and lower may be removed together or separately. There is no need of sealing, stapling, or anything of that kind; the two may be placed together as accurately as die and counter-die. (*Fig. 14*).

QUESTION: What kind of material do you use for occlusion rims?

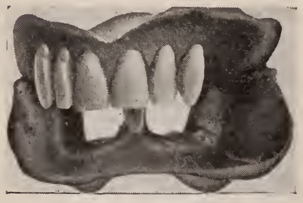


Fig. 14

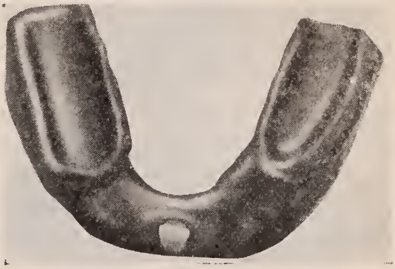


Fig. 15

Fig. 14—Occlusion rims in correct relationship.

Fig. 15—Lower after taking the bite—concave portions in bicuspid and molar regions are the female portions of the bite.

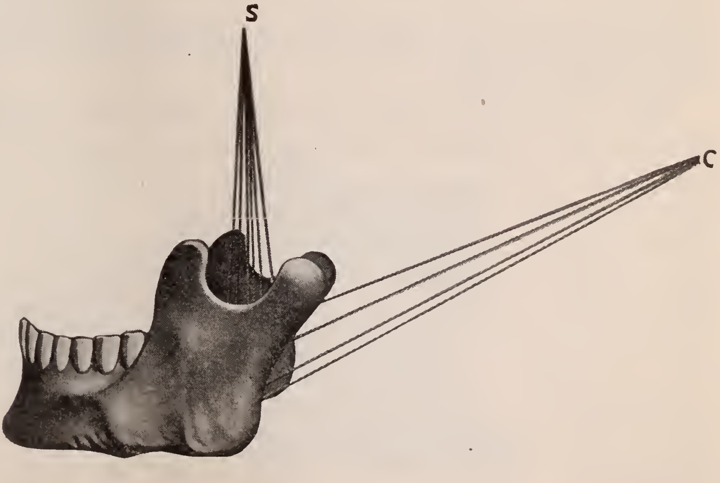


Fig 16—Schematic model of ligaments theoretically extended to cross at imaginary points "C" and "S", which inventors have incorporated in the construction of articulators.

DR. CAMPBELL: Any good, hard pink wax. I use Goldsmith's Wax.

Fig. 15 is a picture of the lower after the blunt, wedge-shaped upper rim has been pressed into it during the closing movement.

We must remember that the jaw without any teeth is a very helpless member. It is limited in its movements by three sets of ligaments. *Fig. 16* presents a schematic model, showing a theoretical extension of the spheno-mandibular, the capsular and the stylo-mandibular ligaments. This model will serve to demonstrate the fact that the rotation point of the mandible may be located at any one of several points. At first, Dr. Hall used as a basis from which to begin the construction of an articulator, the Bonwell Equilateral Triangle. Later, he placed two of these triangles base to base and designated the apex of the posterior one as the point of rotation which, he suggested, corresponds to a point at the base of the skull, the occipital protuberance. In talking with Dr. Hall, I tried to prove to him that his rotation point could not be *the* but was only *a* rotation point. In an effort to prove Dr. Gysi's position, we placed in Dr. Hall's mouth an incisal marker and his jaw movements confirmed Dr. Gysi's statement that the lateral movements describe not a continuous arc of one circle but arcs of two circles, or the Gothic arch. Dr. Monson says the rotation point is at the crest of the cranium, and in demonstrating this he places his jaws in a sphere, and they work with wonderful precision. The fact is that the convergence of these ligaments might be placed at the occipital protuberance, at the crest of the cranium or at any point between the centers chosen by these men. The idea we should like to emphasize is that the problem of determining the exact point of rotation is not the fundamental problem in constructing an articulator; a more important fact to bear in mind is that a universal joint is required, something that will allow the articulator to move in a definite way, grinding a definite cusp angle and determining the synchronous and harmonious relationship of all teeth in both arches.

Fig. 17 shows the Hall Articulator, with guide cup and guide pin, which make it possible to grind the teeth in accordance with Dr. Hall's idea of the cusp angle of the normal bicuspid; he says the plane of the cusp forms with the occlusal plane an angle of forty-five degrees. In lateral occlusion, there are but two points of contact in contra-distinction with the Gysi which has three or more. The inner portion of the disto-buccal cusp of the lower glides upon the occlusal portion of the palatal cusp of the upper second molar on the left side, while the cuspids are in contact on the right. The dentures are balanced by means of a third point of contact which the bolus of food provides; in this instance this will be found on the right side. In some cases, if the set-up be exaggerated, you may place a pencil in the mouth and still have this balanced contact.

It is possible to obtain this same effect on the Monson Articulator. It is as possible to construct a good set of teeth on one of these as on the other. (*Fig. 18*).

Fig. 19 shows one made out of four barn-door hinges and portions of two flasks, and demonstrates the simplicity with which the scheme of the universal joint may be employed. This case was made on this articulator, and afterwards mounted upon the Hall and then upon the

Monson Articulator; the masticatory movements were the same, since these movements are pre-determined by the cusps.

Fig. 20 shows an attachment for the Gysi Articulator. As in the Hall and Monson articulators provision is made for the forward and backward movements which are essential, if teeth are to be ground so that the patient can protrude the mandible during incisal movements and still maintain a balanced contact without cusp interference. The patent on this reads just the reverse of all other patents on articulators in the Patent Office. Other articulators are patented to reproduce movements of the jaw. This is patented with the understanding that any jaw will reproduce its movements. Articulators often provide a latitude of movement beyond that required by the human mandible.

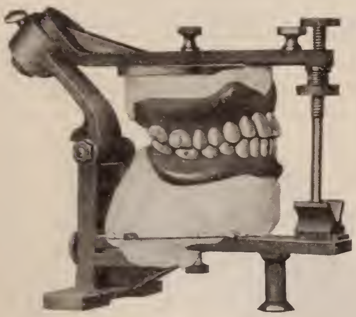


Fig. 17

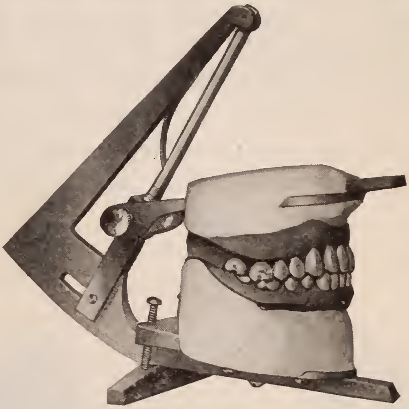


Fig. 18

Fig. 17—A later Hall Articulator.

Fig. 18—The Monson "Mandibulo-Maxillary Instrument," mounted with dentures constructed on the Hall "Automatic Anatomical Articulator," and working with equal facility. The reverse is equally true; this is practical corroboration of the statement that "the tactile sense of the inclined planes of the cusps is the guiding factor in movements of the mandible."

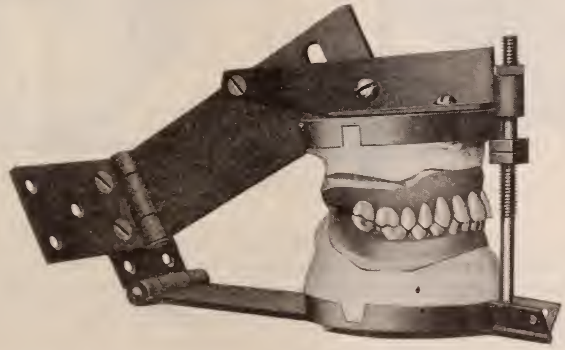


Fig. 19—A crude articulator constructed of two barn-door hinges, bottoms of two flasks, and using cabinet-door hinge for guide cup and a bolt for guide pin. Equals in function the most expensive.

This latitude is not objectionable but it indicates no superiority. *Fig. 21* shows a comparison of movements, some of which are not possible for the mandible.

Fig. 22 shows the casts luted to the articulator, with the upper teeth placed in position so that they will conform to this lower ridge from which all of the wax has been removed. The lower ridge determines the position of the upper teeth, in so far as bicuspids and molars are concerned; that is, they should be in direct line with the ridge, since we know that force emanates at right angles to its source. Consideration of the direction of lines of force gives us in the construction of dentures the problem of leverage, and that is what we have in mind when we speak of anatomical articulation. "Anatomical" in fact is not the correct word to use.

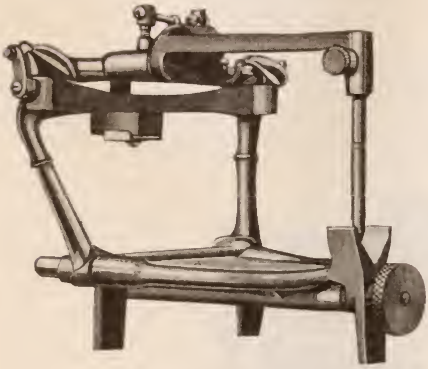


Fig. 20

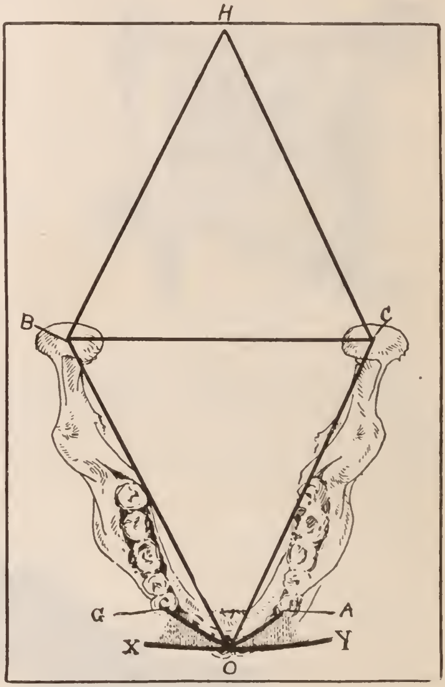


Fig. 21

Fig. 20—The Gysi Simplex Articulator, fitted with the new Attachment.

Fig. 21—Diagram showing that articulators capable of describing arcs of small circles are as efficient as an articulator capable of describing a complete circle. The masticatory movements of the jaw cannot avail themselves of the larger range of movement indicated by dotted area.

After the upper teeth are set up, the lower bicuspid is placed in position with the fingers. A piece of carbon paper is employed to find whether it needs grinding; if it does, it is ground. In this way every tooth may be occluded individually. If you want a "keen" occlusion, as one of my assistants calls it, with the use of carborundum powder and glycerin you may grind the teeth one at a time into position.

With a minimum amount of hot wax the occlusal surface of this tooth is sealed to the antagonizing surfaces. Then when the articulator is closed the tooth will assume its correct position upon the lower ridge. After it is sealed to the ridge, a blast of hot air releases it from the upper teeth. The other bicuspids and molars are set up in a similar manner.

After the cases are vulcanized and polished, then we begin to make of them suitable masticatory substitutes. Most dentists after polishing the dentures insert them and say, "Good bye" to the patient. At this point we are just beginning to supply the needs of our patient; the dentures are placed in the mouth, and the occlusion noted; in the majority of instances one might be tempted to say that the occlusion is satisfactory. Use carbon paper to determine whether there are any very high points. Many times one will find so many markings that he will prefer not to grind them down with the stone. Accordingly, remove the lower, warm a layer of clean carding wax over the burner, flatten it out and place it upon the lower denture. In summer it need not be warmed but in winter the denture may be inverted in a pan of water just a few degrees above luke warm. With the upper denture already in position, place the lower in the patient's mouth and secure central occlusion.

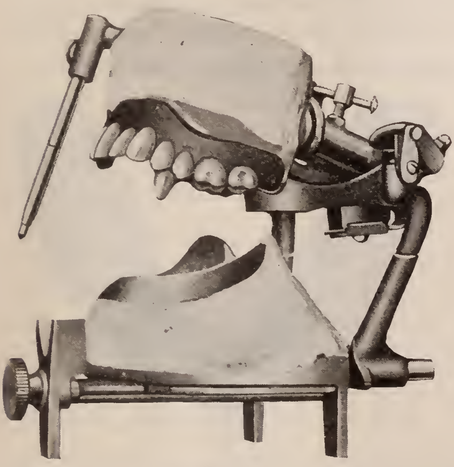


Fig. 22

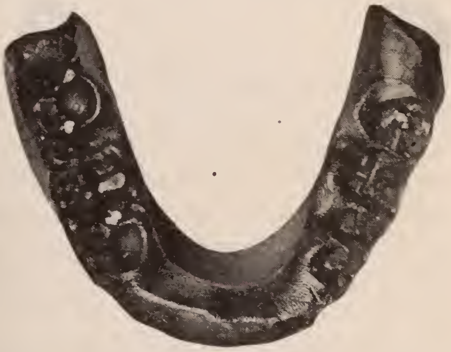


Fig. 23

Fig. 22—Showing the second lower bicuspid ground to minute articulation, and sealed with thin film of wax ready to assume its correct alignment on the base.

Fig. 23—White spots indicate the porcelain showing through at these points after bite has been taken.

The dentures are removed separately and the black wax noted. If the case has been properly set up and care exercised in packing, the operator will have the same contact between the teeth after vulcanizing as he had at first. However, most dentists will find but one or two points of porcelain showing through the black wax. (*Fig. 23*).

These points are marked with an indelible pencil, the wax is removed and a very small carborundum stone is used to grind out the marked porcelain. Grinding out the porcelain is always followed instead of grinding off the opposing cusp. When we have ground out places until two or three or more points of contact are obtained, the upper denture is then placed upon the lower which carries the black wax with imprints of teeth, the case is held under the faucet and washed free of saliva. It is then dried and sealed together with sticky wax after which it is mounted upon the articulator. It is then possible to see the occlusion which has been secured. It will be surprising how much these points of contact already secured will need to be ground out in order that the remaining teeth may be brought into contact. No. 90 or 100 carborundum powder mixed with surgeons' K. Y. jelly, or glycerin, to a creamy consistency, is placed upon the occlusal surfaces of all the teeth, and the guide pin of the articulator is moved up and down on one side, and then up and down on the other side, until the contact of the porcelain with the carborundum powder is no longer felt. The object in grinding is to establish planes of occlusion which have the same relative value as that found in the planes which form the sides of the guide cup. Carborundum powder will cut these cases down within twenty minutes. Just before the occlusion is perfected, turn the screw to bring the teeth forward to incisal occlusion, grind them until they touch in front and then all the way back, as the screw is gradually turned to return to central occlusion. Then place them in the patient's mouth, and he will say that he has a different set of teeth. *Figs. 24 and 25* are self explanatory.

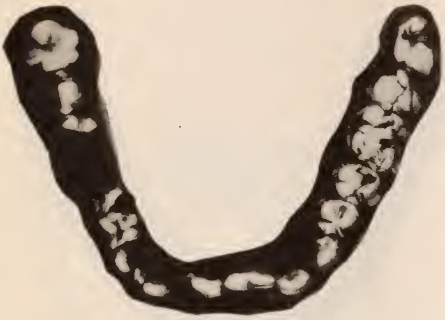


Fig. 24

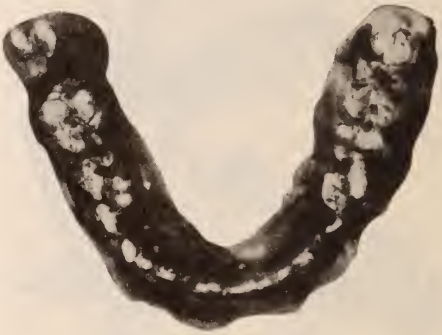


Fig. 25

Fig. 24—A piece of base-plate wax showing imprints of natural teeth (one tooth missing) in final masticatory movement.

Fig. 25—Same as figure 24, but showing the "bite" of artifical teeth after they have been automatically ground on the new attachment.

In closing I wish to call attention to the superiority of metal bases. Thousands of dentists never mention metal bases to their patients. An aluminum denture is much superior to a vulcanite denture, a gold base denture is superior to an aluminum denture, while a continuous gum denture is incomparably superior to all others, yet sometimes none of these are ever mentioned. Why is it that we do not make more metal bases? There is no such shrinkage under a metal base as there is under a vulcanite denture, because the latter keeps the mouth in a chronic pathological condition that predisposes to resorption. We found several years ago that aluminum had no particular affinity for vulcanite; in packing, we found that if the rubber were not soaped the tinfoil, placed upon the Spence cast to provide a smooth surface, stuck to the rubber. We also found that the tin would stick to aluminum; accordingly, when we opened the flask we laid a layer of the tinfoil between the rubber and the aluminum and left it there. Finally, we hit upon the idea of mixing the tin with the rubber and this gave us weighted rubber; we now pack all of our cases with a layer of weighted rubber next to the aluminum and find that this keeps the vulcanite from leaving the metal base. You may use pink rubber, but we prefer weighted rubber.

QUESTION: Do you correct your occlusion immediately after you construct your denture? I have found it is better to let the patient wear them a day or two.

DR. CAMPBELL: I have no objection to that.

DR. CAMPBELL: The writer of a recent article called attention to the fact that the cast aluminum base was not much used by some of the older men, because they found that it became full of holes. A few years ago it was not possible to obtain pure aluminum. It had a percentage of iron or silicon in it, and the galvanic action resulting from the iron and the aluminum in the fluids of the mouth caused an electrolytic disintegration of the aluminum, which produced the holes. They also used 26-gauge aluminum blanks, and when these were swedged down upon a zinc die a minute particle of zinc from the die was carried into the aluminum, resulting, in lesser degree of course, in an action similar to that which the telegrapher gets from the copper and zinc plates in the vitriol bath.

QUESTION: Do you trim the black wax lower than you want the finished plate?

DR. CAMPBELL: No.

QUESTION: What brand of plaster do you use?

DR. CAMPBELL: American Cement Plaster Company's, from Lawrence, Kansas. It is a good grade of cast plaster. It is hard and sets quickly when used with potassium sulphate.

QUESTION: Do you use the same grade of plaster for casts as for impressions?

DR. CAMPBELL: I do not use plaster for casts.

QUESTION: Do you close your flasks with flask bolts?

DR. CAMPBELL: Never. I use a flask press, with Dr. Wilson's volute spring, and we open our case three or four times. Comparatively speaking, we never have any excess rubber when the cases come out.

QUESTION: What do you make your casts from?

DR. CAMPBELL: Spence's Plaster Compound and also Weinstein's Artificial Stone.

QUESTION: What do you use for investing your vulcanite cases?

DR. CAMPBELL: This same plaster.

729 Shukert Building.

THE HUB OF THE CAMPAIGN FOR DISEASE PREVENTION

BY BERNARD FELDMAN, D.D.S., PATERSON, N. J.

(Written for THE DENTAL SUMMARY)

DR. THOS. B. HARTZELL says, "When you wish to arrive at a reasonably just opinion of any type of science or truth, you want the whole of it and not a part."[1]

Through the ages, the simplest truths have become recognized to be such only after many misunderstandings and prejudices had been overcome, and not until great harm had been innocently caused thereby. How much suffering could have been spared our people in a dental way only, if certain untruths were recognized in time by dental science! Judging from the past, it seems to be very easy for a mistaken theory or fallacy to be endorsed by dentists, yet the real truth must batter steadily against walls of indifference, prejudice and custom before it is recognized in all its simplicity and grandeur.

Let me cite a few examples, pertaining to dentistry: Before amalgam was recognized as the greatest tooth-saving filling material, it had to split the members of the dental profession into two conflicting factions. Emetine was heralded as a sure cure for pyorrhea, and many innocent patients were made to suffer before this theory was abandoned. Dentists sacrificed pulps indiscriminately, until the truth of focal infection which followed this practice had become generally known.

There is one truism in dentistry, however, which is deserving of our undivided attention, yet there is a growing indifference to its all-importance. Therein lies a great danger! As time goes on it may be placed in oblivion among other forgotten truths, but it should not be allowed to drift into the darkness; it should be made to flood the world with its splendid light.

Upon this Truth the medical profession can well concentrate its future program of preventive medicine.

I refer to the prophylactic care of children's teeth and mouths in the public schools of this country.

Will anyone deny the truth of this scientific proposition, that such a regular and systematic care of children's teeth has prevented sickness, and has improved the physical and moral condition of the pupils who received this care? If there are such doubting Thomases, let them read and study the memorable reports made by the late Dr. W. G. Ebersole, the father of the oral hygiene movement of this country.[2] God bless his memory! His work with the Marion school children was epochal. Later, Dr. Keyes, of Boston, published his report of three years' activity with the children of an orphan asylum, and he proved that sickness was prevented almost totally amongst these children by no other agency than systematic oral prophylaxis.[3] The cities of Boston and Rochester have their Forsyth and Eastman institutions which are doing wonderful work for the children of these cities. In the meantime, experiments were conducted by Dr. A. C. Fones, of Bridgeport, Conn., whose faith and enthusiasm were directly responsible for the more elaborate experiment with the school children of this city under the direction of the municipal authorities of this city. His report of five years' work has been published recently and is a wonderful inspiration.[4] It inspired the city of Flint, Michigan to go and do likewise![5]

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[1] Thos. B. Hartzell, "When to Extract and When to Conserve Diseased Teeth."—DENTAL SUMMARY, August, 1920.

If the municipal authorities of Bridgeport, Conn., and Flint, Mich. have proved this truism to be worth while, by increasing steadily their yearly appropriations to carry on such work, why can't we dentists influence *every* city to give *all* school children similar prophylactic service? Bridgeport started with ten paid nurses in 1914, who examined and treated 6,768 children during that year. It was found that ninety-seven per cent. of the children had five or more decayed teeth, and ninety-eight per cent. had crooked teeth which spoiled the symmetrical development of the brain-case and the bones of the face. Today, twenty-six nurses are taking care of 20,000 children. Their work consists of: *First*, actual cleaning and polishing of the children's teeth at regular intervals, *second*, giving tooth-brush drills and class-room talks; *third*, giving stereopticon lectures to the children in the higher grades, and *fourth*, distributing special literature to the parents to educate them and to enthuse them with the system. Besides, three women dentists were employed to fill the cavities that were found in the teeth.

Each child received the same treatment regardless of the financial status of the parent. In short, this preventive system was incorporated as part of the school curriculum. Some parents objected, thinking it was a charity, but these objections were soon withdrawn with a better understanding of the project.

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[2] Cordelia L. O'Neill, "Oral Hygiene as It Applies to Educators."—*Dental Cosmos*, December, 1911.

[3] Dr. Keyes, "Oral Hygiene."—1914.

[2] W. G. Ebersole, "Educational Publicity—Why Necessary."—*Dental Cosmos*, September, 1913. "History of the Oral Hygiene Campaign as Inaugurated by the Oral Hygiene Committee of the N. D. A."—*Dental Cosmos*, December, 1911. "Public School Clinics a Possibility."—*Dental Digest*, July, 1914.

[4] Wm. R. Davis, "Dentistry and Public Health with an Account of the Flint Dental Clinic."—*Journal of the N. D. A.*, November, 1920.

[5] A. C. Fones, "Five Years' Mouth Hygiene in Bridgeport Schools."—*Dental Cosmos*, July, 1919.

Dr. Fones' report, "Five years' Mouth Hygiene in Bridgeport Schools,"[5] from which most of these details are being quoted, showed that the average improvement in tooth decay for thirty schools was 33.9 per cent., that there was a reduction of retardation by 50 per cent., that there was a great advancement of the moral self-respect, as well as the physical condition of the children, and that the percentage of communicable diseases is gradually decreasing.

During the great scourge of influenza, Bridgeport had the lowest death record, 5.2 per 1,000 population. This was directly due to the enlightened and educated public's cooperation.

The great world war is over, after the killing and maiming of millions of people and the causing of untold misery and suffering to the rest of humanity. Do the people of this country realize that today there is an even greater war going on in their own midst? An enemy, which is far more ruthless than the Hun, is plucking off victims mercilessly and unceasingly. This dreaded enemy is disease. Against the Hun, we were able to muster an army of three to five million fighting men in record-breaking time. Wonderful, well-nigh unbelievable things were done in the emergency. But what is being done for us to fight the deadly germ, which is deadlier and more devastating than the bullet? (Only two winters ago, following a little wave of influenza, more Americans died here than died on the battlefields of France).

Oh, yes, the playful little germ is "some" enemy. This arch enemy of mankind must be tracked to its lair and exterminated. It is so deeply intrenched that it will take centuries of constant campaigning by a standing army of disease fighters to make any appreciable improvement in overcoming this enemy. Yes, let it be a standing army of three millions of men and women devoted to saving people instead of destroying them.[6] Such a campaign will require vast detail, and I leave it to greater minds to work out the most efficient campaign. In the main, such a campaign will comprise two factors, *i. e.*, reparation and prevention; so that while we will be repairing, healing and curing we will be simultaneously spreading far and wide the gospel of prevention.

But the main thing is to begin this fight in earnest; if eventually, why not NOW?

Let us start immediately with the school children. We older ones are more or less spoiled; but we can and we should do something for the protection and the improvement of the good health of the tots. The care which we will give them today, will bear its fruit twenty or more years hence. What a wonderful generation of men and women we will be rearing for the nation! We are giving our school children at the present time free education. We consider it is one of the country's greatest blessings. Is their good health less important? What is more priceless than good health, which is greater than all the riches and fame and glory? Good health is a God-given thing, but we humans never have fully appreciated it. It's when we have lost it that we will try to turn the earth upside-down to regain it after it is too late. The child's good health comes first; its education can come later.

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[6] B Feldman, "The Trend of Dentistry Towards Governmental Health Bureaus." —DENTAL SUMMARY, April, 1917

So we're going to track the deadly germ to its lair, and, curiously enough, this happens to be the mouth. A germ can't harm unless it invades the human body, the main opening of which is the mouth. As a matter of fact, most communicable diseases can be traced to the germs which are allowed to flourish in the unclean mouth. In order to protect the health of the school children we must therefore turn our attention to their mouths and teeth, and we must take the best care of them in every school under the supervision of paid nurses and doctors. Of course this means a slight additional expense to the taxpayer, just as the Bridgeport appropriation added a slight proportionate share to the citizens of that community. The taxpayer who thinks only of the economic side of the proposition cannot help but be impressed with the great saving that will result from dentists' bills, which children's parents will not pay to private dentists, and from a fifty per cent. reduction of retardation. Retardation means re-education, and the Board of Education of each community will readily grant that the cost of this re-education is much, much greater than the budget which must be appropriated for this dental preventive service. But who can figure in actual dollars and cents the improvement in the moral and physical condition of the pupils and community? Who can figure the actual money value to the families of the victims of the influenza epidemic in each city, and who is so heartless to think of them so cold-bloodedly as money values? They were too dear to us for that. Shall we wait quietly and refuse to protect those people who were spared when such an effective means of prevention is so easily furnished?

Our city authorities deserve great credit for subsidizing so many valuable agencies in the interest of public health, one of which is medical supervision of school children. The latter is good as far as it goes, but it doesn't go far enough. While it is a good thing to call attention to the poor condition of their teeth and mouths in order that they should be corrected, my plea is to institute this dental service as a regular part of the school curriculum, preventing a recurrence of these conditions (creating a healthier standard incidentally) for our future generations. Every city can copy and follow closely a proved system, one that has proved successful in the city of Bridgeport, as outlined above. From any point of view, every city should follow the path which has been blazed, and start this system. Bridgeport has proved that it pays—

not only on the grounds of public economics, but on the broader humanitarian grounds of public health.[7]

What is it worth to each community to have its future citizens grow up to be healthy and strong? We now know that regular compulsory prophylaxis assures us of a future generation of men and women started on the road to good health. Pearly white teeth with well kept gums and oral tissues, will eliminate focal dental, tonsillar and pyorrhetic infections which are responsible for so much sickness that is so prevalent today. We can, we should prevent such sickness in the future. By giving these children good teeth, we are incidentally giving their bodies their *best* chance to thrive as God intended. "We have here the hub of the campaign for disease prevention for the future," said Dr. Ebersole.

It is the privilege and the duty of the members of the dental profession to appeal to the governing bodies of each state to make legal appropriations to carry on this work. South Carolina already has done this[8]. Let us not rest until *every* state has fallen in line in a movement which is so unselfish and worthy that it must rebound everlastingly to the good name of dentistry.

60 Main street.

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[7] Edward C. Kirk (Editorial), "The Bridgeport Demonstration."—*Dental Cosmos*, July, 1919.

[8] Selected Article.—*Oral Hygiene*, August, 1919.

VALUE OF ORAL PROPHYLAXIS

BY ALPHONSO IRWIN, D.D.S., CAMDEN, N. J.

(For The Dental Summary)

We would not decry the brilliant operations of the surgeon, or the phenomenal cures of the physician, the golden jewelry of the dentist, or the artistic display of the prosthetist; neither would we belittle the skill of the exodontist or the mosaics of the inlayist, the triumphs of the orthodontist, or the achievements of the stomatologist; but we *would* declare that the art of *prevention* should take precedence over the art of restoration, *reconstruction* should supplant substitution, *rejuvenation* should replace medication.

An hour spent upon renovation is worth a lifetime devoted to restoration; a day spent upon re-construction is worth a century bestowed upon substitution; a lifetime of prevention is worth an eternity of medication.

THE CLASP AND CERTAIN ATTACHMENTS*

BY H. V. COTTRELL, D.D.S., COLUMBUS, OHIO

WE RIGHTFULLY EXPECT of partial dentures that they restore the lost function of mastication and the lost esthetic features; also, that they maintain position the while.

There are two classes of partial dentures: *First*, those that have for their *supporting* structure the mucous membrane alone, and *second*, those that divide this function between the mucous tissues and the existing tooth structures.

In the first class will be found those dentures that depend upon adhesion for their retention, and those that utilize adhesion together with such frictional contact with tooth structure as will permit free movement of the denture toward mucous structures which are under the application of the force of mastication. In other words, those dentures employing no contact with tooth structures, those that employ stay clasps of various types if they are without occlusal rests or their equivalent, those made to spring into position between converging teeth and without occlusal rests on such teeth, those that spring into position between extensions from diverging teeth and are without definite rests on these extensions or teeth, those special attachments which permit of free movement in vertical tubes, all belong in the first class. In the second class are those dentures employing clasps with occlusal rests of various sorts, those that are built over and on tooth structures in various ways, those employing the cast clasp, broadly speaking, because of the accuracy of its fit, those using the telescope crown, or those with such special attachments as Gilmore, Condit, Kelly, Griswold, and Roach or Morgan when they employ stops.

We must recognize that devices for retention which are brought into direct contact with tooth structure offer no protection to that structure from the ravages of caries; quite the reverse is true except where the parts are kept perfectly clean. A well-fitted bent clasp permits of a very slight amount of abrasion of the tooth it touches, but a well-formed cast clasp permits of none at all. The principal objection to the clasp then, lies in the danger of producing decay.

When clasps are employed, they will appear in the following types: Stay, spring, or ferrule, to either of which the occlusal stop may be attached in different ways.

Wilson puts it very well when he says the stay clasp rests "in contact with the teeth but without lateral pressure," hence it serves merely as a bearing.

The spring clasp, as its name indicates, grasps the large circumference of the tooth in such a namner as to require it to spring slightly to pass over the bulges in the tooth which are along the line of its large circumference. It may cover two sides and three angles, or three sides and four angles of the tooth as may be considered advantageous in a given case. Clasps engaging the bulges on labial and lingual surfaces of cuspids are seldom very efficient except when *cast*, or when an inlay or filling is employed on these surfaces in which a groove is made, and the clasp built

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*Read before the Ohio State Dental Society, December, 1920.

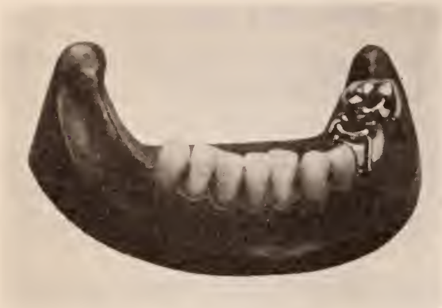

Fig. 1

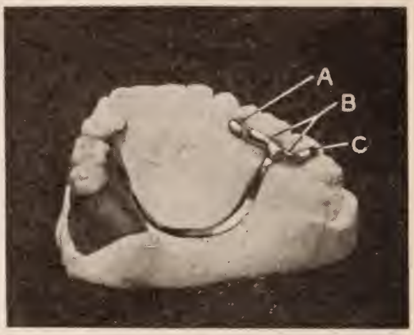

Fig. 2

Fig. 1—Represents the lower case, frequently seen.
Fig. 2—An upper case using clasp on first bicuspid. Attachment engages pontic tooth at "A" and contour of two molars at "B." Occlusal rests at "C" and "A."

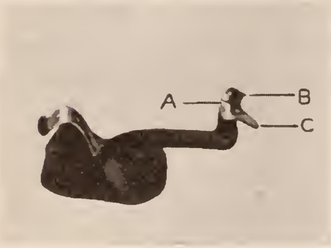

Fig. 3

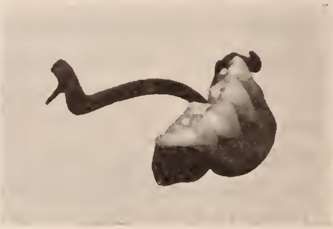

Fig. 4

Fig 3—Alveolar view of restoration in lower. "A" stay clasp, "B" occlusal stop "C" indirect retainer.
Fig. 4—Lingual view of lower.

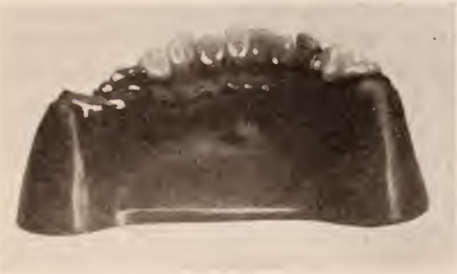

Fig. 5

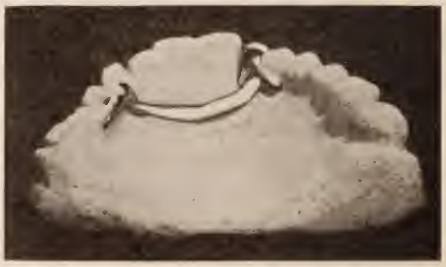

Fig. 6

Fig. 5—Lower in position.
Fig. 6—Upper case supplying lateral, using anterior palatal bar.

into such groove. There always should be a considerable range of elasticity between the load limit and the modulous limit of the clasp.

The ferrule completely encircles the tooth at its largest circumference. All these clasps are termed *direct* retainers.

Clasps should be so located in the arch as to create the best balance possible in the denture. When ideal conditions as to balance can not be created by direct retainers, the *indirect* retainer may sometimes enter in to advantage. This consists of an extension of the denture to make contact with some other fixed point in the arch thereby securing a better balance.

In most partial dentures we should avoid contact with the gingival border. Probably more trouble of various kinds resulting from partial structures may be attributed to their infringement on the gingival border than to any other one thing. Ill effects of such errors have led to the employment of the palatal bar on a great many uppers, and the lingual bar on lowers. This has proven to be a very satisfactory plan of construction, if the proper technic has been employed. The bar should be adjusted in the upper so that it relieves the hard areas, yet lies against others. If it must be used in the anterior part of the palate it should be located between the rugæ, and be of such form that its presence there will not be annoying to the tongue.

In the lower, contact of the bar with mucous membrane, any infringement on the lingual frænum should be avoided.

Sufficient strength and resiliency in the lingual bar may be insured if it is constructed of clasp metal round wire, 14-gauge, doubled and soldered to produce a bar of oval form when completed.

One of the conditions with which we are sometimes confronted presents lost posterior teeth on one side of the arch, with possibly a bridge on the other side concerning which, little, if any fault can be found. (*Figs. 1 and 2*). The operator hesitates to destroy the bridge in order to supply the lost teeth on the other side, yet restoration must be made.

We present here an application of the principles involved in the above discussion pertaining particularly to the spring cast clasp adjusted on the edentulous side of such arch, and an attachment to the bridge on the other side by the use of the *stay clasp*, the *occlusal stop*, and the *indirect retainer* combined in one cast piece. This piece engages the lingual side of the bridge (stay clasp), (*Fig. 3a*), the occlusal side between the lingual cusps of pontic teeth (occlusal stop), (*Fig. 3b*), and a portion of the diagonal of these pontic teeth extending from their lingual cusps to their cervical region (indirect retainer), (*Fig. 3c*).

By this attachment such a denture is held firmly in its position, is easily inserted and removed when desired, is easy to construct and is applicable to either arch.

Hartman Building.

INDICATION AND PREPARATION FOR JACKET CROWN*

BY FRANK C. STARR, D.D.S., COLUMBUS, OHIO

THE PREPARATION of teeth for jacket crown is a subject that is very difficult to give in so short a paper, and without the aid of a lantern.

We have two classes of teeth to consider in jacket-crown work, vital and non-vital.

In considering indications for jacket crowns on vital teeth, malformed teeth might first be considered, such as (general term) peg laterals; defect in development, very frequently the result of scarlet fever, measles, malnutrition, etc., at the time of tooth development.

Malposition or malocclusion frequently may be corrected by this type of restoration, though the orthodontists might best be consulted in a case of this kind.

Then we have teeth badly abraded, though perhaps more frequent than any other is extensive caries, especially in the anterior teeth involving the proximo-incisal, as synthetic porcelain has not proven successful in these cases and gold inlays are undesirable from the esthetic standpoint.

Non-vital teeth would come under the above classification, with the addition of discoloration, which we very frequently find in devitalized teeth.

In non-vital teeth, or where there is a question, always check them up by radiographs.

The completed preparation for a jacket crown is the same in vital and non-vital teeth, except from the standpoint of discomfort to the patient; though I believe if the proper technic is carried out an ideal preparation can be obtained without much discomfort to the patient.

THE PREPARATION

With a medium size carborundum stone, (*Fig. 1*), remove about 2 mm. from the incisal. Then with a one-half inch Joe Dandy knife-edge carborundum stone in a mandrel and the straight handpiece make a line cut from the incisal to the gingival about 1 mm. from the mesial and distal on the labial and lingual. (*Fig. 2*). This cut is made in the enamel to the dentin but not into the dentin; then with an enamel hatchet as a lever, break out the enamel thus denuding the proximal surface. (*Fig. 3*).

Make another cut 1 mm. in from the enamel margin and break away as before. Continue thusly across the labial and lingual surfaces. (*Fig. 4*).

Then with a small stone or fissure bur remove the remaining enamel. A constant stream of hot water (not cold), applied to the tooth when grinding, will really work wonders in preventing pain from friction. This can be applied very nicely by your nurse or assistant, and the saliva ejector will carry it away.

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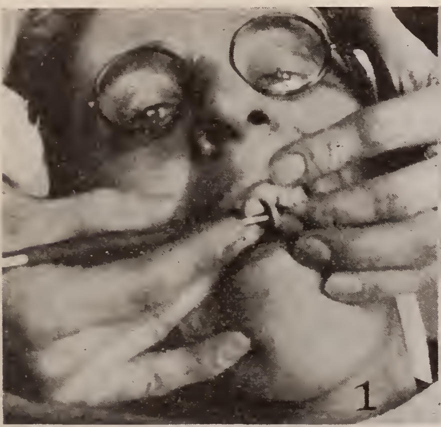
*Read before the Ohio State Dental Society December 1, 1920.

Next remove the enamel under the free margin of the gum with enamel cleavers. (*Fig. 5*).

By far the best instruments I have found for this purpose is a set of ten, designed by Dr. Geo. A. Thompson, Chicago. Most enamel cleavers are so large and clumsy that it is impossible to remove the enamel without lacerating the tissue.



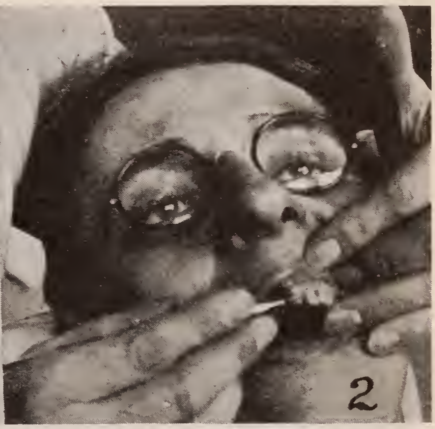
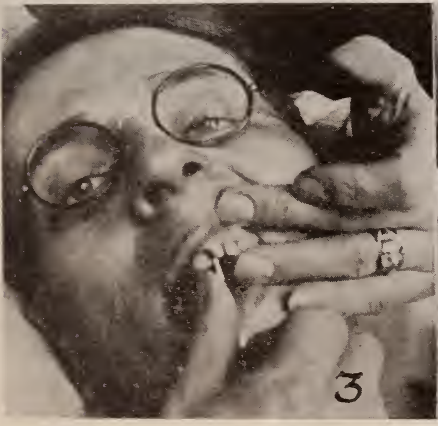


Fig. 1—Two mm. may be cut from incisal at first, or after enamel has been removed.
Fig. 2—With knife-edge stone make line cut from incisal to gingival.



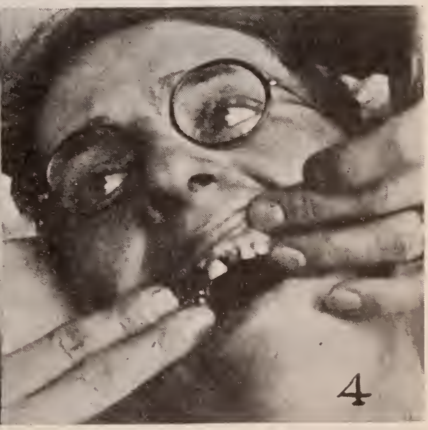


Fig. 3—With straight chisel used as a lever the enamel is broken away.

Fig. 4—Shows the various cuts in the enamel. One cut should be made at a time, using the bulk of the enamel as a fulcrum for the chisel.

It is very essential to remove all the enamel from the tooth if we are to have a perfect shoulder. If you will take a freshly-extracted tooth and try making a preparation with the shoulder at a point that would be beneath the free margin of the gum, without removing all of the enamel, you will readily see how impossible it would be in the mouth.

After the enamel has been removed, take a measure and make a copper band of about 30-gauge, one-half inch long, or perhaps more convenient, have a box of assorted sizes seamless bands extra length (one-half inch) made by the Blue Island Specialty Company. Select one that fits the root at the gingival and trim to the curvature of the gum.

The shoulder is now cut with a plain fissure bur, No. 57, S. S. W.; starting at the center of the lingual, cutting round through the proximal to the labial, then across the labial and through the other proximal, finishing on the lingual at the starting point. (*Fig. 6*). The shoulder should be about one-half mm. wide, well under the free margin of the gum. With a chisel, No. 83, and an end-cutting bur, a nice shoulder can be obtained without lacerating the tissue.

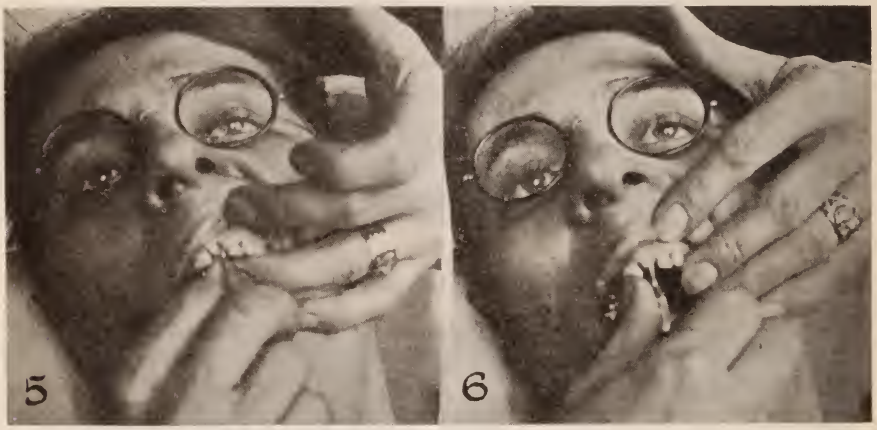


Fig. 5—Enamel cleavers are now employed to remove enamel beneath free margin of the gum.
Fig. 6—Plain fissure bur is used to cut shoulder.

Toilet of the preparation made by paper discs coated with vaseline.

It is advisable before attempting to prepare a tooth in the mouth to first prepare a number of extracted teeth by the same procedure, carefully noting the different planes, especially in the bicuspids and molars.

Never grind the occlusal surface flat, but simply remove the enamel, leaving the natural contour of the dentin.

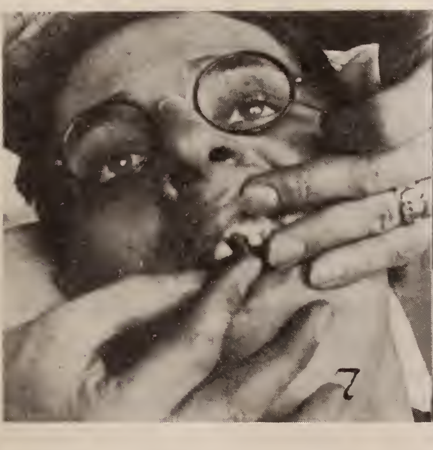
Selection of the shade should be made at this time. Care should be exercised in selecting shades; never attempt it by artificial light; preferably not on dark days nor late in the afternoon. A chart can be made noting any peculiarities you may wish to reproduce.

Impression of root is made by use of the copper band, which was fitted before the shoulder was cut, used as impression cup. Fill with

Kerr's Modeling Compound, heat over Bunsen, hold finger over one end, press into position that will be apically of the shoulder, chill with cold water and remove. (*Fig. 7*).

A model is made from this impression by packing amalgam, building a root on preparation for convenience in handling.

I prefer taking modeling compound impressions of both upper and lower in metal trays individually, as it eliminates danger of distortion, with a small button bite for assembling rather than the mush bite as is sometimes used. While it is very essential to have proper occlusion, it also is necessary to have a definite impression.



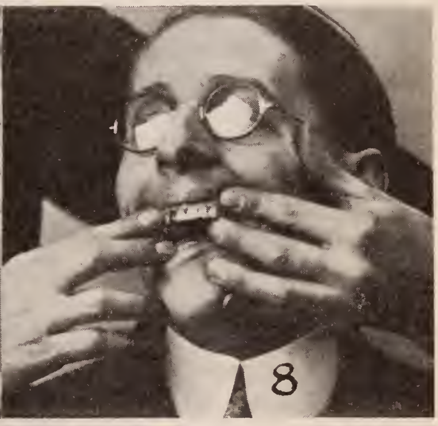


Fig. 7—Impression of root is taken with band that was fitted and trimmed to gum curvature before shoulder was cut

Fig. 8—Completed crown.

Before the patient is dismissed, the root is covered by a temporary crown made of white base-plate gutta-percha and cemented into position by a temporary cement. It protects the tooth from thermal changes and holds the soft tissues in their proper position.

609 Hartman Bldg.

ADVANTAGES OF INLAYS MADE BY SOLDERING METHOD

BY E. H. CHAMBERLAIN, D.D.S., ROCKINGHAM, N. C.

(Written for THE DENTAL SUMMARY)

What is an inlay made by the soldering method?

It is an inlay made by burnishing pure gold or platinum into the cavity as a matrix, and then melting or fusing gold solder into it, preferably 22K gold solder.

How should the cavity be prepared?

The same as for a cast inlay, that is, flat bottom, parallel walls, and always prepared so that the forces of mastication will not dislodge, but have a tendency to seat the inlay more firmly in the cavity. Thin gold can be burnished into the cavity very quickly in all four-walled cavities.

Cut a piece of 40-gauge, 24K somewhat larger than the cavity. Anneal thoroughly and start with a round-ball burnisher, running it around the cavity after placing the gold in position. Anneal again, and use flat-end burnishers to make the matrix conform to the right angle in the cavity walls. If you tear a large hole in the matrix you did not anneal properly; but if the holes are small and in the angle on bottom of the cavity, cut another very small piece of thin gold and burnish over the holes. Then burnish in some large non-cohesive gold pellets. Place anti-flux on the under side around the holes, and melt a small piece of 22K solder over the bottom of the matrix. Place back in cavity and burnish the margins down perfectly and finish filling with 22K solder.

The heat must be evenly distributed or the matrix will be melted or otherwise distorted. Have a good brush-flame and let it play around and over the matrix until the solder melts or flows. The longer you take to melt the solder the greater will be the length of time between the melting of the solder and the fusing point of the matrix.

The advantages over the cast method are:

First, greater strength; since cast gold has a tendency to crystallize and is more easily broken. There is a very distinct advantage when using inlays for abutments, since you can get a stronger union by soldering than by casting to clasp wire or platinum-iridium wire, so often used as posts, staples, etc., in inlays for bridge-work.

Second, there is a very great saving of time for the same operation. A little practice and it is only a few minutes for a simple inlay. The operation can be completed at the same sitting, which is always an advantage.

How are you going to build up corners on incisors, say one-third of the tooth broken down?

By using a piece of solder and strips of 22K gold plate. Simply building up to desired slope. Use iridium and platinum wire or clasp metal wire in all cavities for a staple to prevent distortion when the cavity involves both approximal surfaces of the tooth.

Third, this method is more economical—no casting machines, no investment, no wax, not so much heat.

To those who have not tried the soldering method, let me say that with a little practice you will find it a valuable adjunct to your practice, also that solder will flow when and where you desire.

FACIAL RECONSTRUCTION*

BY LT.-COL. G. C. SCHAEFFER, M.C., COLUMBUS, OHIO

BEFORE taking up the discussion of Facial Reconstruction, I wish to say a few words about the work of the department in the front-line hospitals; that is the field, mobile and evacuation hospitals. After spending several very profitable months in London and Paris, observing and assisting in the facial work on our allied soldiers, it was my good fortune to be assigned as assistant to our senior consultant, Col. Blair, and given the zone of advance and the advanced section of the S. O. S. In this section were the aforenamed front-line hospitals together with about thirty base hospitals which were forced to function most of the time as evacuation hospitals.

It was the plan of our department to have in each one of these hospitals a maxillo-facial team, composed of a surgeon, a dentist, a dental assistant or mechanical man and an anesthetist. This team with its prescribed equipment was supposed to take care of all face and jaw injuries.

There were just two reasons why this plan was not put into operation: *First*, we could not have the teams, and *second*, we had no equipment. We could not have the teams because there were not enough surgeons and dentists in France to allow surgeons and dentists to specialize. A surgeon who was lucky enough to be in France and to have any surgical ability was needed for general surgery, and as soon as he reached the front he was put to work doing it. A dentist not only did jaw work, but he did any sort of dentistry that was required, and in addition, he gave anesthetics, painted signs, inspected garbage cans, and did a lot of other highly professional jobs.

Now, lest someone might think this shortage was the fault of physicians and dentists, let me say that when we first entered the war, our allies begged us not to waste ship space on physicians, nurses, hospitals and hospital supplies, but to send them "fighting men and fighting materials." We had thousands of good surgeons and dentists and nurses, and train-loads of hospitals and materials waiting on our docks ready to go, but we had not the ship space for them. Most of the equipment intended for the use of our teams never reached France until our patients were well on their way to America.

So, not having surgeons and dentists we could call our own, and hence seeing the impracticability of our original plan under the existing conditions, we were forced to be content with a make-shift arrangement. We managed to get at least one dentist in every front-line hospital. It became the rule that he should be called to see every jaw case that came to the hospital. It was his particular duty to see that no jaw fracture be allowed to leave that hospital without first having the jaws immobilized in some manner, whether it be by an emergency splint, interdental or intermaxillary wiring, or a cast-silver or aluminum splint. He worked with whatever surgeon happened to get the case.

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*An illustrated lecture before the Ohio State Dental Society, December, 1919.

There were certain rules for handling the face cases which differed somewhat from the rules for handling general surgical cases. The important points we insisted upon were: *First,* immediate and thorough hemostasis; *second,* immediate and thorough mechanical cleansing of the wound; and in this we differed from the general surgeons, who were cautioned that there should be thorough debridement of all wounds, that is, that all tissue that was dirty or contused, or in any way contaminated by the wound, should be cut away. In the face cases we demanded that there be no debridement, for we found that in these cases there was no danger of gas infection as there was in other parts of the body, and we appreciated the need of saving every bit of face tissue that could be saved; *third,* immediate provision for adequate inferior drainage in every case in which there was a jaw fracture. The great danger of secondary hemorrhage is due to infection, and the danger of infection is made greater if infectious material has not a free outlet at the most dependent point. I wish to say here that we had practically no secondary hemorrhage in our jaw cases; *fourth,* as much primary suture as was consistent with good surgery. These four rules governed the work of the surgeons who cared for the face cases at the front. The dentist looked after the fixation of the jaws.

Right here I wish to pay a tribute to the dentists who did our work at the front. They were on call twenty-four hours every day. They had no assistants, no mechanical men, no laboratories, and practically no equipment. They had to beg, borrow or steal what material they had. They used their ingenuity and whatever they happened to find at hand to do their work. But the big thing is, *they did their work,* and they did it *well.* They used fence wire, telegraph wire, and even chicken wire for making arches and splints. I have seen excellent silver splints made within the sound of the guns, and learned that a young dentist had taken franc-pieces from his own pocket, melted them and cast the silver into splints, and he had no casting machine but the one he made himself out of a lard pail and a piece of wire. And so I might enumerate many instances where the dental man at the front with nothing but his ingenuity to help him, has done wonderful work and secured wonderful results.

I still believe that our original plan of a maxillo-facial team to do the work is the ideal one, but it is fine to know that we have such men as our dentists have proven themselves to be, that we can rely upon if another emergency should arise.

It was planned that much if not all of our real reconstruction should be done in France, and to that end one large and well-equipped hospital was in operation at Vichy. In addition, every base hospital center had its maxillo-facial department with its plastic surgeon and its dentist at work. The work that these men did has been described by Major Ruggles. It was chiefly the permanent splinting of jaw cases, cleaning up dirty, infected wounds, and such plastic operations as the degree of cleanliness of the wounds would permit. This, unfortunately was very little, because all of these cases were infected, and all required many weeks and months of careful treatment before any real reconstruction could be done successfully. Had the war lasted longer, Vichy would no doubt have been the great reconstruction center for our army, so far as facial reconstruction was concerned. With the signing of the armistice however, our plans changed, and it became the policy of the government to get our men home as soon as possible. In this country, three places were set aside in which this work was to be done, Cape May, Walter Reed Hospital, at Washington, and General Hospital No. 2, at Ft. McHenry, Md. It was to the last named place that I was sent when I arrived in this country, and there I had altogether, five hundred and twenty cases. Of this number about fifty were later sent on to other hospitals.

In my service at Ft. McHenry I had two hundred and seventy-eight cases of fracture of the mandible. With possibly three or four exceptions all of these were gunshot injuries, with the fractures compound and comminuted. They had come through various mobile, evacuation and base hospitals in France. They had received their first fixation at one or the other of the first-line hospitals, and had then been permanently splinted at a base hospital. In some cases the splints had been removed, sometimes advisedly and sometimes prematurely. Most of them were still wearing their splints and were allowed to wear them for some time after their arrival. About half of these two hundred and seventy-eight cases were ready for their discharge within eight weeks after their arrival. They had good union, good occlusion and free use of their jaws. This speaks worlds for the excellence of their early care as well as for their good splinting. Of course there was much dental work to be done on them. New dentures and prostheses had to be made, and the dental department at Fort McHenry may well be proud of its accomplishments on these men.

There were approximately one hundred cases of fracture of the mandible with loss of bone, demanding bone graft. All of these with the exception of eight, have been repaired successfully.* The bone-grafting has been done by three methods. In a few, large free grafts from the tibia have been wired in place, the jaws being splinted solidly at the time. In this type of graft we have had eighty-five per cent. successes. There were a number done by the osteoperiosteal method, with sixty per cent. success. By far the greater number were done by the pedicle-graft method, as perfected by Mr. Percival Cole, of the King George Hospital, London. In this class we had no failure at all. The graft is taken from the lower part of the mandible near the symphysis, with the platysma and the anterior belly of the digastric muscles attached. In my judgment it is the operation of choice where it can be used.

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*Since writing above, these have been grafted successfully, all by method of free graft.

Before passing the fracture cases, I wish to speak of the type of splint used. At the front, fixation was secured generally by interdental or intermaxillary wiring. This, however, was only intended as a temporary fixation and was replaced at the base hospitals by a permanent splint. The splints made at these hospitals were usually cast-silver splints, in either closed or open bite. After seeing the results obtained by both methods, I find it hard to make a choice between them. The closed-bite splint insures good occlusion, but is more apt to leave trismus. The open bite almost positively insures against trismus, but there is a little more danger of malocclusion. In the hands of a careful man however, an open-bite splint made on an anatomical articulator is very safe as regards occlusion. We never had any trouble with them at the King George Hospital, and I have not had any trouble with those made by Dr. Ruggles or by many of our other dentists. At the King George and at Fort McHenry it was customary to gold-plate them, as we found they did not tarnish and the patients would keep them cleaner than the unplated silver splints.

Of the face wounds requiring plastic repair there were all kinds, from the simplest sort of scar to the complete loss of noses, lips, chins, eyelids, and ears. Many of these were associated with fractures of one or more bones of the face, and in these there were many in which there was loss of bone as well, as in the nasal and malar bones, and supraorbital ridge of the frontal. The simpler scars were excised and where the adjacent tissue would permit, it was drawn together carefully, primary union secured, and the resulting suture line would soon fade out leaving a clean, smooth surface. In one case a burn scar an inch in width and over two inches in length over the chin was excised, the skin of the neck undermined and drawn up to cover the exposed surface with hardly a line to show, and the neck had apparently as much skin as ever, demonstrating very clearly the great elasticity of the skin. In the deeper scars resulting from wounds with loss of soft tissue which had been left to heal by granulation, the scars were excised, the skin undermined on each side and a fat-graft from the abdomen, large enough to fill in the defect sutured lightly in place with fine cat-gut and the skin sutured over it. Rather large defects in the cheek may be repaired very satisfactorily in this way. Where the defect includes a loss of bone as in the malar or supra-orbital ridge, cartilage from the sixth or seventh rib may be used. This can be cut any shape needed, and if placed next to living bone will become just as solid as the bone.

In taking the cartilage, the rib perichondrium should be left, and new cartilage will replace that which has been removed. In some of these cases where the loss of skin has been too great, it may be necessary to turn a flap of skin from some other part to cover the defect. Skin grafting in the face cases is not used to any extent, as a skin graft always will show a different color and texture from the surrounding skin; in repairing defects of the eyelids, the Wolfe graft may be used with very good cosmetic result. In doing this, the bed should be very carefully prepared; all bleeding should be arrested; the graft should be cut carefully from the inner side of the arm, no subcutaneous tissue should be taken, and it should be sutured so that the edges are brought accurately together. Then a rather firm dressing should be applied so that the raw surface of the graft is approximated closely to the raw surface of the bed. I have had some very nice results from this procedure and have seen some beautiful results in cases operated by Major John Wheeler, at Fort McHenry.

Bone, cartilage, fascia, fat and practically any other tissue may be transplanted successfully from one part of the body to another if it be done properly, and if the bed to which it is transplanted has sufficient blood supply. In transplanting skin it always is safer to do it by the pedicled-flap method. Sliding flaps or transposed flaps of skin with its subcutaneous tissue are very successful about the face where the blood supply is abundant. In the repair of lips, chin, cheek, and eyelids, as well as on the nose, flaps taken from adjacent parts with good pedicles, grow well. For the lip, upper or lower, usually enough tissue can be gotten from the cheek, turned up or down as the case may require, and shaped to make the lost part. The bed from which the flap is taken usually can be closed by sliding adjacent tissues together. In some cases where the cheeks are scarred, tissue must be brought from the neck, scalp, chest or even from the abdomen. Large flaps from the neck, with good broad pedicles may be turned up to the face, and I have used them successfully for the making of lips, cheek, and even for the repair of part of the nose. In one case in which there was complete loss of the upper lip and considerable scarring of the cheek, a large flap was cut from the top of the scalp, left attached at both temples, and turned down to supply tissue for the lip. It proved very successful, and in addition to giving the man a lip, it also provided him with a mustache.

In the making of a nose, the framework was made of costal cartilage, the lining usually of bits of skin turned in from either side, and the skin covering from a large flap taken from the forehead. It has been clearly demonstrated that the forehead skin is the best for the nose as it lies flat to the bone and does not take on fat. The dentist has a very important part in the plastic work as we depend upon him to make the splints for the nose and the prosthesis upon which the plastic work is built. In my work at Fort McHenry I used a nasal splint made by our dental department, which I consider the best of its kind I ever have seen. Capt. Storrs was largely responsible for it and should have credit for it. It was composed of a cast-silver splint cemented to the upper teeth. From this a rod extended out, and on this rod the nose pieces were adjusted in such manner that any desired motion could be obtained. It was used in all rhinoplasties to hold the nose in position until healing was complete.

One of the most valuable aids to plastic surgery that has come out of the war is known as the epithelial inlay. There were many cases in which, as a result of the scars, there was shortening of the mucosa of the eye or mouth, particularly of the mouth. The old method of Esser was used at first, and surgeons were very careful not to open into the mouth before the inlay had taken. Major Gillies, of Sidcup, England, found that he could get good results by simply freeing the adhesions in the mouth, or in the socket of an eye, shaping a piece of modeling compound to fit the space, and covering this with Thiersch graft, and fastening it into place. It is a most unsurgical procedure, but in spite of the oral infection always present, it takes and supplies a good epithelial surface. This procedure has simplified the work on many cases that formerly were very trying.

In the lantern slide demonstration which is to follow, I shall show the picture of the patient before operation, and then show drawings illustrating the method of operating, and finally the photograph of the patient after the work had been completed. Many of these cases are still incomplete, but they have been discharged from the army and will return later for additional work under the U. S. Public Health Service. They came into the army with good faces. Not all of them were handsome, but they were not repulsive looking. As a result of their honorable wounds many were made repulsive looking. We have attempted not to beautify, nor even to wipe out all trace of their honorable scars, but to make them presentable so that they can mingle with their fellowmen without attracting undue attention.

A few only of the many cases shown on the screen, are here reproduced.

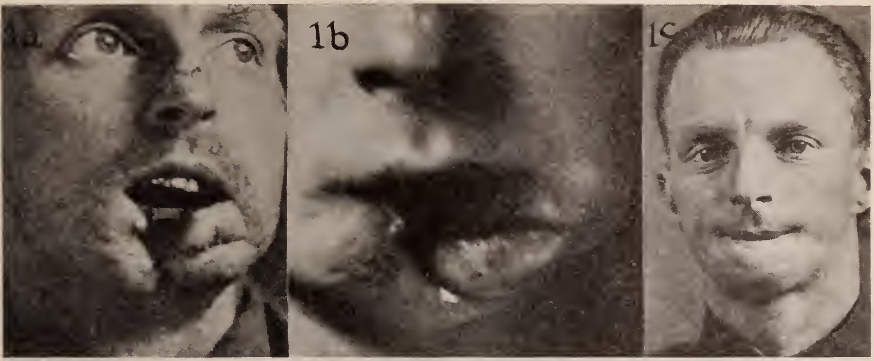
Case No. 1. Machine-gun wound causing loss of two and one-half inches of bone at symphysis, together with considerable loss of soft tissue of lower lip, chin, and floor of mouth.

(a) Just after maxillary splint was applied; before operation.

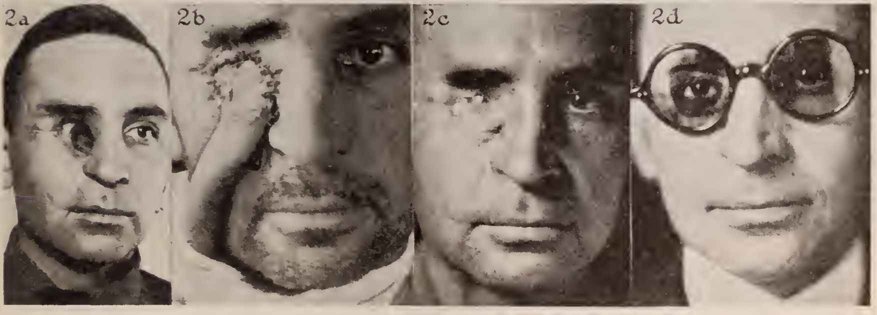
(b) After wound had cleaned up; before operation.

(c) As he was when discharged.

In this case no bone graft was necessary, as when he was received into the hospital there were several small fragments of bone (possibly a quarter of an inch in diameter) left in the soft tissues. These fragments were carefully maintained in place and from them there developed a good shaft of bone, connecting the ends of the mother bone, thus giving the patient a very good solid jaw. The chin and lip were made from flaps from the neck and face.



Case No. 1



Case No. 2

Case No. 2. Machine-gun wound causing loss of right eye, all of the contents of the orbit, the lower orbital margin and both upper and lower lids. The maxillary sinus was opened above, the frontal sinus below, and the inner wall of the orbit being destroyed, the nasal cavity and orbit were thrown into one cavity.

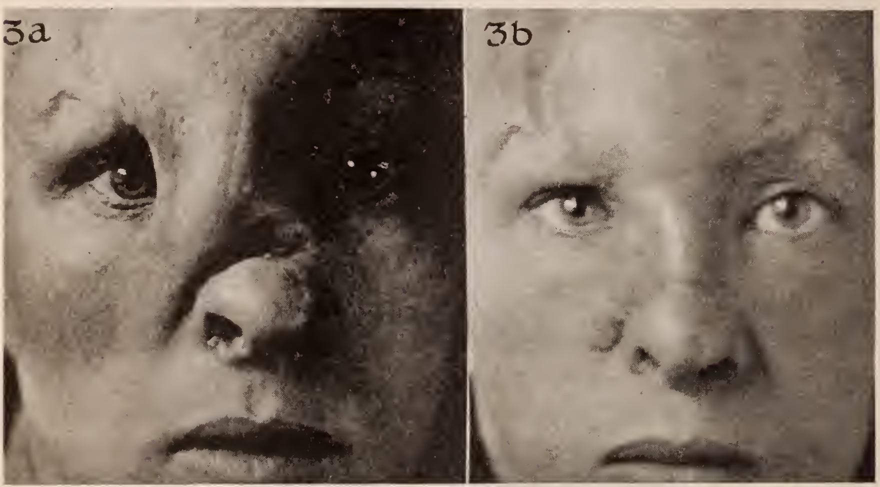
(a) Before operation.

(b) First step in repair. Tubed flap turned up from chest and epithelialized pad of skin sutured into the orbital opening.

(c) Condition after healing of flap.

It was the intention to split this pad of skin, epithelialize a socket sufficiently large to hold an artificial eye and shape lids. As the new pad of skin was very hard, it was thought best that considerable time should elapse before this was attempted, so a prosthetic appliance was made by the dental department, consisting of a vulcanite body enclosing an artificial eye and shaped to represent lids in front and to fit the skin pad behind, the whole being attached to spectacle frames, and the patient is shown in

(d) wearing the prosthesis.



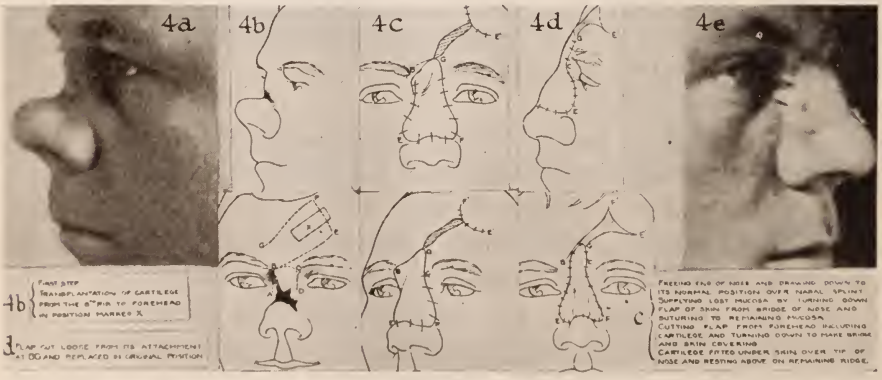
Case No. 3

Case No. 3. Gunshot wound, causing considerable loss of the nasal bridge, skin, bone and cartilage. An attempt had been made to repair the defect by turning down a flap from the forehead and inserting cartilage from the rib. This first attempt was not successful and the first picture

(a) Shows patient as he was when first seen by the author.

This flap was cut loose, the old cartilage removed, a fresh piece taken from the sixth rib, the flap trimmed to fit and sutured in place.

(b) Final result.


4a
4b
4c
4d
4e
4b
FIRST STEP
TRANSPLANTATION OF CARTILEGE
FROM THE 6TH RIB TO FOREHEAD
IN POSITION MARKED X
d
FLAP CUT LOOSE FROM ITS ATTACHMENT
AT DG AND REPLACED IN ORIGINAL POSITION
c
FREEING END OF NOSE AND DRAWING DOWN TO
ITS NORMAL POSITION OVER NASAL SPLINT
SUPPLYING LOST MUCOSA BY TURNING DOWN
FLAP OF SKIN FROM BRIDGE OF NOSE AND
SUTURING TO REMAINING MUCOSA
CUTTING FLAP FROM FOREHEAD INCLUDING
CARTILEGE AND TURNING DOWN TO MAKE BRIDGE
AND SKIN COVERING
CARTILEGE FITTED UNDER SKIN OVER TIP OF
NOSE AND RESTING ABOVE ON REMAINING RIDGE

Case No. 4

Case No. 4. Gunshot wound causing partial loss of nasal bones, complete loss of cartilaginous bridge, and considerable loss of soft tissue of nose. Tip and alæ were left intact.

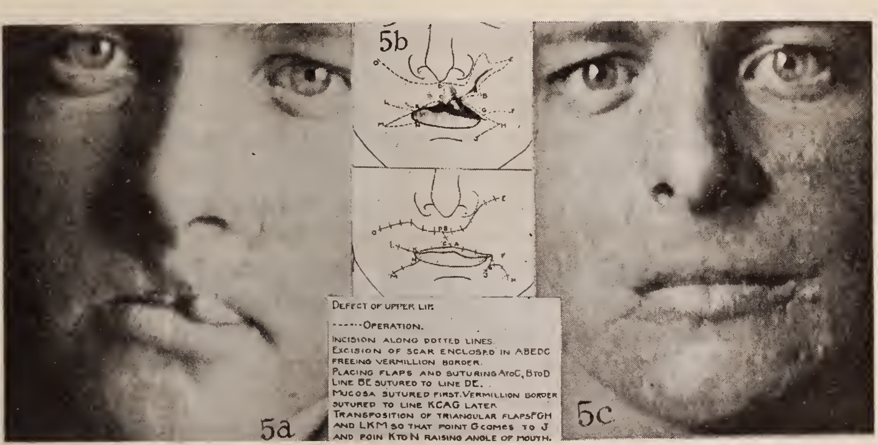
(a) Before operation with heavy red scar over bridge. Nostrils closed.

(b) Scheme of operation, showing cartilage (x) placed under skin of forehead two weeks before flap was cut. Flap outlined.

(c) Flap cut and turned down with cartilage included. Flap left attached at BG.

(d) Condition after flap was trimmed and part replaced in forehead.

(e) Picture taken when healing was about complete.



DEFECT OF UPPER LIP.

------OPERATION.

INCISION ALONG DOTTED LINES.
EXCISION OF SCAR ENCLOSED IN ABEDC FREEING VERMILLION BORDER.
PLACING FLAPS AND SUTURING A TO C, B TO D
LINE BE SUTURED TO LINE DE.
MUCOSA SUTURED FIRST. VERMILLION BORDER SUTURED TO LINE KCAG LATER
TRANSPOSITION OF TRIANGULAR FLAPS FGH AND LKM SO THAT POINT G COMES TO J AND POIN K TO N RAISING ANGLE OF MOUTH.

Case No. 5

Case No. 5. Gunshot wound, causing defect of upper lip with heavy unsightly scarring.

(a) Before operation but after healing of original wound.

(b) Scheme of operation.

(c) Final result.

246 E. State street.

SUCCESS IS NOT MADE BY LYING AWAKE AT NIGHT, BUT BY KEEPING AWAKE IN THE DAYTIME

TREATMENT OF COMMINUTED FRACTURES OF THE MANDIBLE*

BY H. A. POTTS, M.D., CHICAGO, ILL.

IN DEALING WITH THIS PHASE of the subject it must be conceded that the comminuted fracture is but one form of fracture, and that, according to its location or extent, it may be considered as the principal object of study, or as a complication of a fracture of less severity.

The general plan of treatment of mandibular fractures must be kept in mind, namely, the reduction of all viable fragments, the retention of all teeth, if they are not detrimental to repair, in their normal occlusion, and the retention of all bone fragments and osteogenic tissues in as nearly normal positions as possible.

As each case presents a different picture, many methods and devices must be brought into play in order to meet the indications mentioned.

Efficient drainage, as indicated either before or after reduction and retention, is all important, as these cases are almost invariably infected. One should anticipate the needs of the case rather than wait until pus has formed and the vitality of many fragments has been lost.

If the patient has been seen early and presents an open wound, all dead soft tissues and detached bone fragments and foreign bodies should be removed. Small attached fragments may be temporarily wired to larger ones or to a splint used to immobilize them. Circumferential wiring may be employed to draw into place and retain larger fragments, the wire being passed around the bone and twisted over a splint.

When the bone is badly minced, the parts may be molded and held more or less satisfactorily in place by modeling composition beneath the chin, at least until, by plastic exudate, the parts become a little more stable, when they may be better retained by other appliances. When external appliances are used they should be broad enough beneath the chin to prevent compression (by bandages) of the fragments toward the median line.

It is desirable, when teeth and much bone have been lost, to hold the remaining periosteum in its normal relationship as, in many cases, by regeneration of bone in its proper place, bone grafting may be facilitated and in some cases their necessity avoided. Fragments of teeth, fillings and roots should be sought for in the soft tissues, as many times they have been found quite distant from the site of fracture. Tooth roots exposed in the line of fracture should be removed, although at times they may be utilized temporarily for the retention of a fragment; but their retention may be at the expense of union, as they are frequently the sole cause of nonunion.

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*Read April, 1920, in the Section on Stomatology (Amer. Med. Asso.), of which, by special arrangement, THE DENTAL SUMMARY is the representative organ for the dental profession.

Retarded union is often due to the presence of a devitalized tooth whose root, even though it may be some distance from the line of fracture, exhibits a restraining influence due, no doubt, to bacteria or toxins retained within the canal; and in such a case the roentgenogram may be negative. At times one encounters a persistent discharge of pus due to a piece of dead bone. Six weeks is ample time for the dead bone to be separated from the living, and one should not longer delay its removal.

A cavity between the plates of bone should not be allowed to remain, as it fills with fibrous tissue, which either fails to calcify or by its slow process retards healing to a marked degree. Such cavities should be obliterated by cutting one or the other plate away, allowing the periosteum to fall into the concavity, which readily heals.

Sometimes one sees a bony growth extending from the body of the bone toward the floor of the mouth. Such growths may become quite extensive, but they seldom cause distressing symptoms. The theories advanced by Girard and Maurel are that they develop from osteoperiosteal tissues carried into the depths at the time of injury, or that they spring from bony spicules pulled away from the symphysis by the geniohyoglossus in its retraction at the time of injury or later. Infection also plays its role in all probability in these hyperostosis.

At times we may be justified in retaining a large sequestrum involving the diameter of the bone, provided the wound is draining freely and it is frequently irrigated, in order that the periosteum may mold the new bone supplying the lost part, when, if the sequestrum were removed, the periosteum would collapse and the space become shortened. The prototype of this is seen in involucrum formation and restoration following phosphorus necrosis.

The avoidance of extensive scar formation about the jaws and face is very important, and a great deal can be accomplished in this direction by drawing the skin over the granulating surface by means of laces, or even Thiersch grafts, until a plastic operation may be attempted.

One should anticipate difficulties of respiration, when by loss of tissue or comminution, the anterior attachments of the tongue and hyoid muscles are broken; a ligature through the tongue looped around its tip may avoid a tracheotomy, the facilities for which should always be at hand.

If an infection assumes the character of a Ludwig's angina, it should be incised, a T-shaped incision being made use of preferably.

It is extremely important that these patients be made ambulatory as soon as possible. It seems to stimulate their vital forces, create an appetite, and contribute to the relief of their depressed mental state.

The employment of eusol, surgical solution of chlorinated soda (Carrel-Dakin solution) and dichloramin-T has not proved so useful in wounds communicating with the oral cavity as in wounds of other parts of the body.

Potassium permanganate, 1-1,000 or even stronger, is one of the best medicaments to control the fetid odor, which is very marked in most of these cases. The use of the douche-can irrigator three or four times daily is essential, and the patient should have a supply of his own which he should use every hour as a mouth wash.

When, after the body of the bone has been restored, there is still a falling-in of the soft parts due to loss of the teeth and alveolar process, the contour of the face may be restored by a suitable dental prosthesis.

At times there are pernicious attachments of the mucous membrane of the cheeks and lips to the bone which preclude the possibility of dental appliances. In such cases the sulcus may be restored by incision and a Thiersch graft retained on modeling composition held in place by bands and wires fastened to the remaining teeth.

The problem of feeding is an important one and should be forced as much as possible (some form of food every four hours), malted milk and other infant foods, ice cream, fruit juices and meats which have been passed through a meat grinder being used. These should be alternated with the other liquid foods in order that the patient does not tire of them.

When, on account of the injury, the patient cannot swallow except with difficulty, a nasal tube may be employed.

In general, each case should be considered from three standpoints: *First,* the restoration of the bony jaw; *second,* the restoration of mastication; *third,* the cosmetic result.

"From quiet homes and first beginning,
Out to the undiscovered ends,
There's nothing worth the wear of winning,
But laughter and the love of friends."

OHIO STATE SOCIETY

PRESIDENT'S ADDRESS*

BY CHARLES W. MILLS, D.D.S., CHILLICOTHE, OHIO

THE EVOLUTION of our human relationships and the interdependence of man is one of the products of modern civilization. Passing from primitive man through the various stages of development, we find a corresponding increase in this interdependence. Man's dependence is proportionate to his wants; the fewer these are, the more capable he is of supplying them himself. With human progress and civilization, came a wider and fuller vision of life; his necessary wants began to increase and he was no longer able to supply them with that rude kind of self-help in which each one does practically everything for himself. The beginning of barter became evident with mutual need; the product of man's handiwork was exchanged for some commodity or service which he, himself, could not produce or render; he remained content to produce the same commodity for exchange, and in so doing, increased his efficiency in his own line of endeavor to the point where he was accepted as a master in that art, and his output was as eagerly sought by some other craftsman whose skill had developed some other commodity, equally as important in the supply of human needs. Thus men began to specialize, and with this increase of vocations, the stronger became the interdependence, and with it we find the passage from independence to dependence, "from distrust to confidence, from hostility to amity," which is the foundation of progress and civilization.

Man's interests naturally became more varied, his capacity to enjoy increased and he soon became capable of living a fuller and more complex existence. Unhappily for the degenerate of the human family but fortunate for society, the environment in which man always has been placed is such that the things desired are not furnished spontaneously and in unlimited quantities. True, we have the so-called "free goods" such as air and water—things we seldom think of as "wants" because furnished by nature in such abundance as to fully supply our need of them; but the so-called economic goods exist in quantities less than sufficient to supply all of our wants for them. The pessimist might look upon this as the niggardliness of Nature; others, that it is the insatiability of human desires, but the paramount fact is, that we must economize in the use of the material things which we require, and exhibit a willingness on our part to undergo sacrifice to obtain them, which is usually done only by exertion and thrift. Without this effort and exercise of self-denial we fall short of obtaining the good things of life. It would indeed be a pessimistic attitude to consider man's only motive in economic activity one to provide for himself and his own maintenance and self-development. There are other and more altruistic ones, such as affection for others, which causes him anxiety for their welfare and often this is a more effective spur to activity than the former.

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*Read before the Ohio State Dental Society, December, 1920.

Material things constitute but one class of goods. Personal service, such as that of the professional man, constitutes the other, and is so recognized because it contributes to our well-being as largely as the material goods. Personal qualifications such as good health and technical skill make a man's services of greater value, but they are a part of him rather than of his possessions. His services are his assets. These he sells, and as such, are acknowledged as "goods."

In the great drama of human life therefore, we, as a profession or as individual dentists, must acknowledge our interdependence and our services as the only asset we have to barter for the possession of other goods that are capable of satisfying our wants—goods, that, owing to our specialized work, we, ourselves, are unable to produce. We confront those social phenomena that are due to the wealth-getting and wealth-using activities of man.

What preliminary training has been afforded the dental student previous to his receiving his diploma and his initial bow in the arena of practice to cope with these problems? None, to my knowledge; and basing my opinion on observations during the past few years, many who have been in practice for a good many years have gained little from contact with the business world. Business itself is a profession. It is profit-seeking, and the successful business man is the product of many years' experience in the mercantile pursuits. To my mind it is a travesty on the intelligence of a professional man to have one of his own calling who is totally incapable of making a living out of his profession, pose as an instructor in salesmanship of such professional services. Until our dental schools realize the importance of installing a chair in economics, occupied by a business man of wide experience, this condition must continue. Seek counsel if you need it from one in touch with business activities. One's banker who is in the very midst of the financial life, would, it seems to me, make a good counsellor, when an investment is to be made. One banker of my acquaintance who helps to place thousands and thousands of dollars every year at a good profit to the investor, has the reputation of never having had a customer lose a cent in following his suggestions. This, no doubt is unusual, but it shows that after all it is a fairly safe course to pursue. And it always has seemed to me that physicians and dentists were the most gullible of all people when it comes to investing in wild-cat schemes.

It is not the purpose to concentrate your minds solely on the financial result of your services. That would cause our losing the realization of the high calling of our profession. No man should become the subservient slave of greed. While the ordinary man desires money for satisfaction of his own wants and those of his family, his friends, and those who are in need, a normal man desires friends, the good will and good opinion of his fellows, and the satisfaction of an approving conscience; none of which can be bought.

It is an alarming condition and there is something radically wrong in our profession, which warrants the Dental Supply Trade in rating ten per cent. of the dentists unworthy of credit, and forty-five per cent. as dilatory in settlements. Without inquiring, and accepting these figures as based on their business dealings with our profession, we must conclude that there is either a marked lack of business acumen or many of our operations are failures. Statistics show that the greater per cent. of dental operations on a patient who has reached the age of twenty-five, are on teeth previously operated upon. Teeth that have been free of caries up to that period seem more immune; due no doubt to stricter regard to hygienic measures, a more correct and better balanced diet, and a more perfect metabolism generally, with the per cent. of destructive end-products greatly decreased. The inference would be therefore, that a large per cent. of our operations are faulty. This is a direct injustice to our clientele. A duty greatly overlooked, is, that we should measure up our ability to the operation we have at hand. Let the matter of personal equation determine in our minds as to how the patient can most permanently be benefited by our skill. Many can make an amalgam restoration that will give satisfactory service for years, and meet with an inglorious failure with a gold inlay for the same restoration. What can best be done by the operator in any particular case is the best for the patient, regardless of what some other operator might consider best. Never allow anyone to shake your confidence in yourself nor shatter your self-reliance; for this is the foundation of all great achievement. Confidence in your skill has attracted the patient to you, so maintain his good faith by giving the best in you, and that is only that which you can do most capably, with a resultant increase of patronage and prestige in your community.

"The first years of life must make provision for the last," and the sooner we get away from the seeming indifference that is often shown to the work which lies at hand for each of us, the better will we be able to procure that competency to which Samuel Johnson referred in the above truism. Life has its duties and legitimate pleasures, and he plays his part best who attends to the fulfillment of the one in a manner that will enable him to experience the enjoyment of the other.

Ability, integrity and personal credit are the three most potent factors to render this possible. The two former are the result of application and a regard for moral soundness. Personal credit is their reward, and its establishment largely marks our consequence in a community. It is increased by saving, and this is brought about by the weighing of two wants: a present want which he refuses to satisfy, and a future want which he wishes to provide for. If the thought of the sacrifice which he will have to make is overcome by the attraction of the advantage which he expects by saving, he has further laid his foundation for personal credit.

Saving, however, is no less necessary as a provision against the unexpected, as well as for known future wants. It is difficult for an individual to create a reserve fund large enough to provide against such risks as fire and death, and the importance of insurance for the protection of your assets should not be overlooked. A minimum sum is sufficient to cover the value in loss by fire. Mortality tables show how many of a large group of persons of the same age will survive to each higher age, and that "death follows life with equal and certain step with only a narrow interval between." There is no lease upon life, and the immediate founding of an estate by the payment of premiums is afforded by life insurance. The many advantages of this system of protection cannot be mentioned in an address of this nature, but it is considered a most wonderful invention in that it renders harmless the most enormous risks which would crush a single individual, by spreading them over a great number of persons at a very slight sacrifice to each. Naturally this insurance increases your personal credit and enhances your financial prestige in the community.

Much has been written in reference to the financial side of dentistry, and it is not within the compass of this address to offer any panacea to overcome the many obstacles in the conduct of a practice. The question of fees seems paramount in the present day of high costs and is one for us to solve individually, and should be based on the appreciation one has of the value of efficient service and the knowledge he has of the importance of the dental organs in the physical economy. If he is lacking in both and is firmly settled in his ways, his case is hopeless. The location and arrangement of an office; the forming of acquaintances and the management of patients are essential factors. The most courageous thing to be done is to be absolutely honest with the patient. First be sure of your diagnosis; use all possible caution, taking all the time necessary for your conclusions, and having made yourself sure of your ground as to what undoubtedly is best for the patient, be plain-spoken, honest and firm. The appearance of reception and operating rooms makes a strong impression on a patient and goes far toward moulding opinion of the ability of the dentist. One who is careless in his appointments is usually so in person, and nothing is more distasteful to a prospective patronage.

Much of our carelessness in this respect is due to the monotony of our own minds; to the same old program of interests, of ideas, of people and things; the daily routine, with little or no variation. These conditions call for a change to new surroundings to give the mind a chance to free itself from its besetting thoughts and moods. The need of change is inherent in all humanity. Someone has said, "It seems to me I am always distractingly busy just getting ready to live, but I never really begin." The most of us are in this plight. We put off taking a holiday in which to rest our minds and bodies until perchance we will have lost the capacity for such enjoyment—so deep in the rut of routine work have we sunk. We are thereby losing one of the greatest factors for making a success in our profession, for a continuous round of uninteresting events, the same daily grind gives us no new thought for discussion, no interesting topic to present to our patients who perhaps are also in need of a stimulus for change of scene and thought.

It may be the alluring city with its bustling populace, or the trackless forest with its myriad forms which call forth our admiration. Those of us who live amid the noise and din and clamor of the city, should, as often as possible, run away to the quiet of the fields and woods in answer to the call of the wild. We should pitch our tent and build an open fire, and there in God's out-of-doors, forget the duties and cares that beset us and allow ourselves to be lured into a restful companionship with Nature. Naturally, those of us who dwell in the quiet of the country or small town, need just the reverse of that life to quicken our mental faculties. The theater, the opera, the busy life of city streets waken in us the need of and desire for action, and spurs us on to greater endeavor. While we are "off duty" as it were, we rejoice in the new environment, with no regret for the conditions left behind. But by and by the glory around us seems to fade; our minds revert to the haunts from which we came, and on our return, the gladness of going forth scarcely compares with the bliss of returning. We have tasted novelty and have found it good; chiefly as a spice to "quicken the familiar" and we enter upon our duties with renewed ambition and greater enthusiasm.

Good health always has been considered the greatest blessing, and my personal experience during the past two years have brought this fact most insistently to my mind. As individuals we should look as carefully to our own physical welfare as to our willingness to serve humanity. Robert Louis Stevenson it was who said, "Perpetual devotion to what a man calls his business, is only to be sustained by perpetual neglect of many other things." As dentists we are prone to plod along content in our own sphere of science and grow narrow-minded, being so engrossed. We should make much of the cultivation of real friendships both in the profession and out of it. This perhaps means more to the young man just entering upon his life work, and so, with a vision of his future self, with a clear purpose, with dauntless effort and a noble desire for success, he should carefully choose his friends. In this, the different dental societies, where there is a community of interests in the betterment of the profession, the modes of operation and the general outlook should be a very real help. How much inspiration and cheer my friends have been to me, would indeed be difficult to say; the exchange of thought and feeling has comforted and encouraged me many times. Always a deep and abiding friendship is good for the soul. We should find diversion and mental recreation in some outside "hobby." We should broaden our interests and show more activity in public affairs; through our component societies and as individuals we should make our influence felt in matters of civic interest and in those of general helpfulness. This is a line of service in which we have been somewhat lacking. That which is good for a community is better for the individuals in it, and we should feel morally bound to show our loyalty in any cause for civic improvement. My interest was aroused in the recent Stadium drive in Columbus, when forty per cent. of the dentists here contributed seven thousand dollars. This speaks well for their civic pride and they have set an example well worthy of imitation.

In September, a notice, over the signature of my brother, Dr. Edward C. Mills, of Columbus, ex-president of this society, was received by me, to the effect that a strictly non-partisan delegation of dentists of this State proposed to avail themselves of the opportunity afforded by the front porch campaign of Senator Harding, to lay before him a statement of what dentistry requires for its most effective and unselfish contribution to the public welfare; also that an audience had been arranged by Mr. Stephen E. Ludwig, of Columbus, through the Republican National Committee, for Thursday afternoon, September 23. While fully in accord with the proposition, but fearing my presence might give semblance of a State Dental Society affair, I personally did not attend. The Central Ohio Dental Society acted as escort to this delegation of some two hundred and fifty dentists, who were cordially received by Senator and Mrs. Harding. Their request was, that in those matters which affect the health and physical welfare of our people, which will doubtless receive the attention of Congress and the Chief Executive, the dental profession receive that consideration which its importance merits.

In a previous formal communication, calling attention to the importance of dentistry in relation to public health, prevalence of caries, and the necessity of oral hygiene, the following general instrumentalities were stated as necessary to meet the present exigencies:

First, a unification of the present National, State and Municipal Health conservative activities, under a definite department of the National Government.

Second, a prompt recognition by such a department of the widespread menace of diseases of the oral cavity in their relation to public health, with a due recognition of the importance of the dental profession, as well as the medical, in the handling of this condition.

Third, a proper and proportionate representation of the dental profession in appointments of those at the head of present health activities and future amplifications of the same.

Fourth, an early and vigorous governmental attention to public education along oral hygiene lines.

This, the first instance to my knowledge in the history of dentistry, of a delegation of dentists pointing out the requirements of the profession to a presidential candidate, seems a very commendable step for the cause of dentistry, particularly along legislative and educational propaganda work. We are now reliably informed that Senator Harding and others prominently connected with the incoming administration, were very favorably impressed with the suggestions conveyed by this delegation of dentists, and I consider it a matter of first importance that this meeting formally adopt suitable resolutions and forward them to President-elect Harding, thus keeping the matter prominently before him. Legislation along this and parallel lines is almost certain to be recommended in his message to Congress, and nothing should be left undone towards suitable recognition for our profession.

On the theory that a clean tooth never decays, the necessity of educating the public in oral hygiene should be emphasized more forcibly than ever before. The government has taken active steps to control some alarming health conditions disclosed through physical examination of our young manhood during preparations for the late war. With the recognized importance of the teeth in relation to health, we should procure as early as possible governmental aid in spreading the gospel of oral hygiene. Thousands of dollars are spent annually in preventing and combating the diseases of stock, and certainly a small per cent. of that amount should be appropriated to this cause—for the conservation of teeth and tissues of the mouth, the vital importance of which has not been given the publicity that the condition demands.

There are barely enough dentists in our country to give proper service to twenty per cent. of our population; on the basis of fifty thousand dentists to one hundred and ten million people, each dentist administering to the requirements of six hundred individuals.

With the proposed lengthening of the college course the situation will become even more serious, and with our present number we will be less able to cope with the situation than at present. With the constantly increasing demands for dental service the greater has become the desire, or rather the necessity of delegating certain portions of our services to those recent adjuncts to the profession, recognized in some states and sanctioned by law as dental hygienists and mechanical dentists. Many of the dental colleges have prepared a special course of instruction for these branches. The dental law of Ohio makes no provision for licensing a dental hygienist or mechanical dentist, though at the last special meeting of the legislature a bill for that purpose was introduced, but failed to pass owing to lack of support.

Some states have been unfortunate in recognizing different grades of dental operators and assistants; while their services are supposed to be rendered under the supervision of a licensed or registered dentist, in many instances it was found that these assistants would own an office, employ a licensed dentist, usually an unfortunate in the profession, and would himself operate without supervision.

The nurse is a necessary adjunct to the physician. Her work, however, is generally considered secondary, but is nevertheless, of the utmost importance. Oral prophylaxis during the last few years has been considered essential to the maintenance of proper normal conditions in and about the teeth and for the prevention of caries. If, then, it is of such importance the work should be delegated to one of ability and training. Unlike the secondary work of the physician's nurse, this work if delegated to the dentist's nurse or hygienist, throws upon her one of the most responsible duties of the dentist.

Since the granting of suffrage the rights of male and female are equal. Would it be considered class legislation if this field of activity were open only to the female, to the exclusion of many worthy young men of technical ability, who, for the same reason as the female hygienist, are unable to meet the requirements necessary to receiving the dental degree?

In this connection it might be well to refer to the men who laid the foundation for dentistry. They considered the importance of a medico-dental education and the means of procuring it. The following is an excerpt from an address given by professor James Taylor in 1861:

"The leading idea for several years was to have a department of dental surgery attached to medical colleges. But the medical faculties had already too much to teach, and it was feared that while by this course all might be made dabblers in dental practice, but few would be made proficient in dental science. The more our specialty was looked into, the more important it appeared, and it soon became too large for annexation in that way.

"Professor Chapin A. Harris is certainly entitled to the credit of making the first movement in the right direction, and of establishing that system of instruction which alone can give character and stability to our profession. I am truly glad to see that this system gains more and more in favor, and I cannot see why any member of the profession should hold back in regard to that which exalts and dignifies his own profession and himself."

The possibilities of dentistry have unfolded since the above was uttered, and the magnitude of its importance has increased. If then, one of the most important features of dentistry is to be entrusted to assistants, their educational training should be proportionate to their responsibilities.

Not only are the possibilities of the profession greater, but the burden of responsibility has likewise increased, as the teeth are considered the source of all ailments that the physicians are unable to attribute to any other cause. Whether this is considered a stigma on our efforts in the past or not, we, with the physicians, are not infallible in all our efforts. It is axiomatic that "to err is human."

Clinical evidence is sufficient that many constitutional ailments are greatly ameliorated by the removal of teeth with an obscure blind abscess, whether apical or peridental. This fact has been so widely published that the laity, physicians and many of our own profession have become over-credulous; the medical profession has taken the opportunity to shift many over-drugged hypochondriacal patients, often with depleted pocketbooks, to the care of the dentist; many dentists have thrown up their hands in despair in their efforts to preserve pulpless teeth, and have themselves enlisted in the crusade against the teeth by limiting their practice to exodontia and X-ray work.

From experience and observation, to me it seems that this tirade against the teeth has passed the zenith, and the dental profession seems to be gradually regaining its equipoise. Useless sacrifice of teeth, the culpable manner in which patients have been shifted back and forth between physicians and X-ray specialists and relieved of almost everything but their original trouble, seems to have savored of graft and commercialism rather than honest, efficient, professional service. An inclination to consult one's dentist first in regard to dental ailments seems to be gaining favor, and in the wake of this follows greater conservatism.

Clinical evidence also has demonstrated that the ability to preserve a pulpless tooth for many years of service and have it remain free from apical infection does not lie beyond the pale of human limitations. Proper filling of root canals before the apical tissues become hopelessly involved is evidence of this fact.

The education of the laity in regard to the seriousness of root infections, through the publicity of the subject in current literature, is inciting more prompt attention in the matter, which renders the dentist's skill more available in maintaining normal apical conditions, and leads to a higher appreciation of this service.

There are a great many alarmists who pronounce the verdict against the teeth, before the existence of a foci or even granuloma is fully established. Incorrect interpretation of the film is not uncommon, sometimes due to improper angles; a shadow cast by the inferior dental canal or by a foramen is not uncommonly mistaken for apical trouble. In cases of constitutional ailments, the fact is often overlooked that an apical infection is a small part of the infection to which the patient may be subject. The tonsils may be affected; pyorrhetic condition may furnish several square inches of pus-producing surface, thirty or more feet of intestine that is a bacterial tract from infancy until death, besides infection of some internal organs, any one of which conditions might produce a more virulent condition than an apical infection, be it abscess or granuloma.

With such possibilities of bacterial infection we should exercise some sanity in the question of removing suspected teeth; even through lack of other evidence than that furnished by the X-ray, conservatism should be our slogan, because in removing the teeth you are destroying the masticating mechanism on which proper digestion and proper nutrition and assimilation depend, and this at a time when the patient's condition is least able to undergo so serious a shock. If in your judgment the teeth should be removed, it should be done gradually, at intervals of a few days, giving the leucocytes time to clear up the infection that is thrown into the circulation upon the removal of such teeth.

From the dental aspect it would seem within our province to prevent apical foci of infection; to conclude that this is impossible and to cease in our efforts, will set dentistry back at least a century. The all-important subject today, and upon which the salvation of dentistry and the longevity of the human race largely depends, is a development of a root-canal technic by which foci of infection can be prevented in the oral cavity; it is possible and clinical evidence sustains the assertion.

What shall be done with our existing cases of granuloma due to apical infection, is one of the perplexing questions before the profession today. There are many cases due to faulty root-canal fillings, and other cases in which the pulps have died under a restoration, that had the roots filled properly, with radiographs taken at intervals of a month or six weeks showing the gradual building in of the bone. It is questionable whether these cases will fully heal, as the tissues about the apices usually are destroyed, a blind abscess developing many times, without symptoms.

Too much stress cannot be placed upon the importance of immediate procedure with the earliest symptom of apical inflammation, for on this largely depends the preservation of the periosteal and peridental tissues, without which we soon have those necrotic conditions which largely depend upon surgical procedure, the result of which, while in some cases seem beneficial, are largely resorted to as the last and only hope.

There are no suggestions to offer at this time for the betterment of our organization. Its present condition is the result of many years of earnest effort on the part of those who have been keen to promote the interests of dentistry, and this success has been proportionate to the cooperation and loyalty of our membership, which I believe to be one hundred per cent.

At the annual meeting in 1884, a discordant faction sought to wreck this organization, and would have succeeded had it not been for the loyalty of a few men who foresaw the possibilities in an organization such as ours, and the prerequisites we enjoy today are due in the main to their earnest efforts. Since the reorganization of that date, in which all disturbing factions were eliminated, we have had a healthy and vigorous growth. During this period, never has there been anything done in the State Society by the men who have been active workers, except in a constructive and progressive way, and with the idea of promoting its best interests and that of its members. In the great sisterhood of State Societies which makes possible our excellent National organization, Ohio, as in all other activities, is found in her accustomed place in the front ranks.

My most ardent wish, after that for the health, prosperity and happiness of you, my fellow practitioners, is one for continued and uninterrupted harmony in our society. Let us emulate the example of the men who first called this organization into existence; their devotion to the cause and advancement of dentistry laid the foundation of the profession as we find it today, and enables us to serve humanity better.

There is a commendable spirit existing in our profession to acknowledge the services and long years of usefulness of many men in our profession—usually in the form of testimonial banquets. There have been several functions of this nature during the year, among them one by the Maumee Valley Society, in October, to Dr. S. D. Potterf of Defiance, who had completed his fortieth year in practice and service in this society; one at Portsmouth, Ohio, to Dr. W. D. Tremper who had spent fifty years in practice; another the 27th of November, to Dr. L. E. Custer, by the Miami Valley Society at Dayton, Ohio, in acknowledgment of his scientific and literary contributions to dentistry:

"Do not keep your sublime love and tenderness sealed up until your friends are dead; fill their lives with sweetness, speak approving, cheering words while their ears can hear them and their hearts can be thrilled and be made happier by them. The kind things you mean to say when they are gone, say before they go; the flowers you mean to send for their coffins, send to brighten and sweeten their lives before they leave them. If my friends have alabaster boxes laid away, full of fragrant perfumes of sympathy and affection which they intend to break over my dead body, I would rather they would bring them out in my wearied and troubled hours and open them, that I may be refreshed and cheered by them while I need them. I would rather have a plain coffin without flowers, a funeral without an eulogy, than life without the sweetness of love and sympathy. Let us learn to anoint our friends while they are yet among the living. Post-mortem kindness does not cheer the burdened heart. Flowers on a coffin cast no fragrance backward over the weary way."

And while this honor is due to the living, we still feel that a great deal is due to those who have gone before, and some of our members have crossed the Great Divide since our last meeting. Let us stand then, for just a moment with bowed heads in tribute to their memory and as a token of our humble acknowledgment and submission to the Will of the Amighty.

(The secretary reads the names of the following deceased): W. G. Ebersole, D. H. Morgan, F. L. Cary, Hamlin Barnes, J. A. Evans, J. P. Dorticas, W. E. Linn

The unveiling of the memorial tablet to Dr. F. H. Rehwinkel at Chillicothe, Ohio, on November 29, is another evidence of professional appreciation of a life that was unselfish in its devotion to dentistry, and henceforth his tomb will afford another shrine for those in need of encouragement and inspiration.

Much credit is due to Dr. T. I. Way, chairman of the J. R. Callahan memorial for the progress made since our last meeting, and his report should stimulate increased activity towards completing the quota for this fund from Ohio.

In the appointment of the various committees who have served during the present administration, men were selected who, in my judgment, possessed the necessary qualifications to prepare a program, the excellence of which I do not believe has been surpassed in our history; one that will furnish new ideas of practical use in every day effort.

I appreciate the assistance of the various members of the several committees for their activity, counsel and words of encouragement during the year. My labor with them has been one of love. To all of these men and the members of the society I extend my greatful thanks for the honor that has been conferred upon me. Any mistakes that have been made were of the head and not of the heart.

We are but transitory beings, but each should remember that he has a part to play, a work that only we, ourselves, can accomplish. We may always be sure that the hand of God will uphold our world on its way through countless other worlds, as He has done "since first the flight of years began," so we have no cause to worry about things the human mind is incapable of conceiving. But we must never forget that what we build will be the foundation for the next generation's structure. Shall we build loosely and carelessly necessitating the pulling down of our work to be made over into a solid foundation? Or shall we as individual citizens and as a profession be true to ourselves, to our convictions, and conscientious, in the belief that we are doing our best for the present and the future? Let us give our lives, our energy, our enthusiasm, all to the highest work of which we are capable.

"A sacred burden is this life ye bear,
Look on it, lift it, bear it solemnly,
Stand up and walk beneath it steadfastly,
Fall not for sorrow, falter not for sin,
But onward, upward, till the goal ye win."

EDITORIAL

DENTAL SEPSIS AS A CAUSE OF CANCER

In writing on the subject of cancer, Dr. F. St. J. Steadman, of England, says it is his belief that cancer rarely occurs in any part of the body without a more or less long standing chronic inflammation preceding it, and that a chronic septic condition of the mouth is by far the commonest predisposing cause of cancer. As a result of an investigation of forty-four thousand cases of cancer in the male, he found that no less than thirty-seven thousand cases occurred in the alimentary canal and its associated parts, or eighty-five per cent. of the cases examined.

Out of 112,801 cases in both sexes he found that sixty-three per cent. of the cases occurred in the alimentary canal, twenty-six per cent. of the cases occurred in the sexual organs, and ten per cent. of the cases occurred in other parts of the body.

In writing on the prophylaxis of cancer, Sampson Handley says: "The importance of chronic irritation, and especially of bacterial irritation, as a cause of cancer emerges ever more and more. It is probable in my opinion, that oral sepsis comes only second to syphilis as a cause of mouth cancer. In cases of cancer of the tongue, carious teeth and pyorrhea are prominent features, and, as causing gastric ulcer, oral sepsis is a remote cause of gastric carcinoma. A national campaign against oral sepsis probably would lead to an appreciable diminution in the mortality of cancer."

Dr. Daniel says: "If the antecedent to cancer formation is irritation of the tissues, then it follows that bacterial infection is the commonest known cause of cancer. The widest spread form of bacterial infection known to me is oral sepsis, and I believe, therefore, it is the most prevalent antecedent cause of cancer, both direct and, by its remote action, indirect. Any form of sepsis in any part of the body, is liable to the same grave charge as oral sepsis; today we are only considering oral sepsis and its almost universal prevalence. Nor do we need to insist upon the actual presence of bacteria in the part which has become cancerous, although without exception all cancers are infected with micro-organisms. The changes which end in cancer-formation may be initiated by the bio-chemicals known as toxins, the bacteria themselves existing in some remote tissues; and if this be granted, then, in my belief, the commonest cause of such a toxemia is oral sepsis."

Returning to Dr. Steadman's investigations; we find that the result of an examination as to the mouth conditions of 204 patients suffering from cancer in the alimentary canal, he found that 165 were suffering from advanced cases of chronic suppurative periodontitis; 30 from moderate cases of the disease; 8 from slight pyorrhetic conditions, and in one case the mouth was free from any trace of pyorrhea alveolaris. He thus found that 99.5 per cent. of these patients were suffering from periodontal disease. After his long series of investigations, Dr. Steadman says he is convinced that pyorrhea alveolaris is by far the commonest predisposing cause of cancer of the alimentary tract. And that it also seems probable that pyorrhea alveolaris predisposes to cancer in other parts of the body, by starting and keeping up a chronic inflammation upon which malignant change eventually supervenes.

DENTISTS ON HOSPITAL STAFFS

At the last meeting of the National Dental Association, the committee on Hospital Staffs, consisting of Drs. A. E. Smith, Chicago; C. E. Kells, New Orleans; C. R. Lawrence, Enid, Oklahoma, and W. H. G. Logan, Chicago, recommended that in the standardizing of hospitals the personnel of the staff should include a competent dentist. Subsequently resolutions were passed by the association and as they are of interest to the whole profession we publish them herewith:

Resolved, That in the standardization of hospitals the personnel of the staff should include a competent dentist whose duties should include consultation with the attending physician and aid in diagnosis by locating the source of focal infection in the mouth; and be it

Resolved, That such dental member of the hospital staff should insist on thorough use of the X-ray for locating diseased teeth and pyorrhea pockets and that he should be trained in the correct interpretation of dental radiographs and that the interpretation of such radiographs be made preferably by the dental member of the staff; and that such dental member should supervise the instruction to nurses in the preparation of patients' mouths for operations and in the general oral hygiene for patients; and that he take care of any dental operations; and that a dental engine and other necessary instruments and apparatus for emergency operations of all kinds be provided.

Be It Further Resolved, That it is the sense of this association that the suggestions made and the policy outlined in these preambles and resolutions be adopted as the future policy of the Association, and that it be earnestly requested that hospital staffs be so constituted that the fullest cooperation may be had between the physicians and dentists in the diagnosis and treatment of cases.

CORRESPONDENCE

CIRCULAR LETTER TO DENTISTS

BY DR. JOSEPH COLT BLOODGOOD, BALTIMORE, MD.

Since the American Society for the Control of Cancer has been educating the public on the early signs of small lesions of the skin and mucous membrane, which may ultimately develop into *cancer*, I have seen many hundreds of patients with *leucoplakia* or white patches in the mouth, and other small lesions of the lip, tongue and mucous membrane of the mouth, all of which were apparently due to smoking.

The majority of these patients have been under the care of dentists who, although they have done their dental work well, have failed to recognize tobacco as the causative agent and have not advised their patients to stop smoking.

From my observation the reduction in the number of deaths from cancer of the oral cavity is largely in the hands of the dental profession. For this reason I take the liberty of calling your attention to it and enclose a small pamphlet on what information will do to prevent or cure cancer.

The following abstract from the circular concerns cancer of the mouth:

"Every adult, especially male, should know that the appearance on the skin or mucous membrane of the mouth of any kind of an area differing from the normal skin or mucous membrane, such as a wart, an ulcer, an unhealed wound, is an abnormality which, if left alone, may change into cancer. I am confident that cancer of the skin and mucous membrane of the oral cavity will practically disappear if the public is given this information in such a way that it will be understood and acted upon.

"Every adult male who smokes must know the added danger he incurs of cancer of the oral cavity, lips, tongue, and mucous membrane of the mouth.

"Every individual should understand the importance of keeping the mouth clean and seeing a dentist from time to time. Such oral sepsis and the care of the teeth are much more important to smokers.

"The profession should know that when a smoker comes to them because of a painful, or changed, area on the mucous membrane of the mouth, the most important thing to do is to emphasize that tobacco in any form must be discontinued at once and the teeth be placed in perfect order. If the area does not promptly heal when this has been attended to, it should be completely excised with the knife or a cautery, or both."

940 No. Charles St.

SOCIETY ANNOUNCEMENTS

Ohio Headquarters at Milwaukee

The Ohio Dental Club sent a representative to Milwaukee in September to look over the hotels and we have selected the Hotel Wisconsin as our Ohio Headquarters. We have reserved sixty rooms for one hundred people. These are being taken very fast.

If you intend to attend the meeting and wish to be with the Ohio dentists, make your wants known to the club officers at once.

The club will have a special train leaving Cincinnati, Saturday noon, August 13, arriving in Milwaukee Sunday morning.

E. L. PETTIBONE,
6503 Detroit Avenue, Cleveland, Ohio.

Michigan State

The next annual meeting of the Michigan State Dental Society will be held at the Hotel Statler, Detroit, April 11 to 16, 1921.

William H. Elliott, 7643 East Jefferson Avenue, Detroit, Michigan, chairman of the program committee; W. H. Waller, 613 Washington Arcade, Detroit, in charge of exhibits; W. A. Cook, 422 McKerchey Bldg., Detroit, in charge of hotel reservations.

CLAUDE S. LARNED, *Secretary*,
614 Post Bldg., Battle Creek, Mich.

Battle Creek, Mich.,
January 8, 1921.

Alumni Society of the Dewey School of Orthodontia

The next annual meeting of this society will be held on April 25 and 26, at the Hotel Ambassador, in Atlantic City. The usual high standard of the meetings of this society will be maintained. Clinics and evening sessions will be included in the program. All interested in orthodontia are cordially invited to attend these meetings.

GEORGE F. BURKE, *Secretary*,
741-43 David Whitney Bldg., Detroit, Mich.

Kentucky State Dental Association

The next annual meeting of the Kentucky State Dental Association will be held in Louisville, Ky., April 13, 14, 15, 1921; Seelbach Hotel as headquarters. A clinical program of unusual interest is being arranged.

Address all correspondence to, W. M. RANDALL, *Secretary*,
Louisville, Ky.

INDIANA STATE

CLAYPOOL HOTEL, INDIANAPOLIS
(*per usual*)

Four Great Days, May 16-19, 1921

MAY 16—AFTERNOON

"The Dental Hygienist," ALFRED C. FONES, D.D.S., Bridgeport, Conn.

Synopsis—How to put on an Oral Hygiene Campaign—Features to be included and avoided in a law—The use and advantages of a Hygienist in your office—Benefits to the profession.

EVENING—"Oral Hygiene," (illustrated) ALFRED C. FONES, D.D.S. Meeting open to the public.

Synopsis—Necessity of Oral Hygiene in our public schools—Conditions as they existed before and after an Oral Hygiene Campaign in Bridgeport—Illustrated by moving pictures.

MAY 17—MORNING

"Denture Prosthesis," M. M. HOUSE, D.D.S., Indianapolis, Ind.

Dr. House will deliver a lecture on some phase of the denture problem of interest to the average dentist.

"Gold Inlays," R. H. VOLLAND, Iowa City, Iowa.

Synopsis—Cavity preparation Illustrated with lantern and models.

AFTERNOON—"Diagnosis of Syphilis from a Dental Standpoint," WM. F. KING, M.D., of Indiana State Board of Health.

This lecture is illustrated, showing mouth lesions.

EVENING—"Gold Inlays," illustrated lecture, ROSCOE H. VOLLAND, Iowa City, Iowa.

Synopsis—Making of wax patterns—Investments—Dissipation of wax, dry and moist methods—Double Inlays—Metals.

MAY 18—MORNING

Those in attendance will be divided into four sections and Dr. Volland will give clinics to each section.

Synopsis—Investment mixing, applying, etc.—Oven and other methods of dissipating wax casting appliances—Rings, formers, sprues, machines and blowpipes—Actual casting of inlays—Exhibition of sample castings.

AFTERNOON—"The Relation of Malocclusion to Preventive Dentistry," LANDIS M. WIRT, D.D.S., South Bend, Ind.

Synopsis—Dr. Wirt will take up the orthodontist's viewpoint and responsibility of preventive dentistry.

"Periapical Bacteriology," CARL D. LUCAS, D.D.S., Indianapolis, Ind.

This is a continuation of the research work Dr. Lucas gave us last year on this important subject.

(Continued on page 270)

INDIANA STATE—Continued

EVENING—"The Care of the Gingivae in Preventive Dentistry," H. E. FRISELL, D.D.S., Pittsburgh, Pa.

Dr. Frisell is president of the National Association and there is no more capable man anywhere to present this important subject.

MAY 19

Seventy-five clinics covering all phases of Dentistry.

By all means arrange to attend this meeting. You cannot afford to miss this remarkable program. Reserve hotel accommodations early. Several other conventions are booked for this week, and that means crowded hotels.

EARL BROOKS,
Noblesville, Ind., Feb. 9, 1921. Ex. Commttee

Philadelphia Dental College—Alumni Society

The annual meeting of the Alumni Society of the Philadelphia Dental College will be held on Wednesday, April 20, 1921, at 9:00 A.M., in the College building, Eighteenth and Buttonwood streets, Philadelphia. All members of the Alumni should note the date and arrange to be present.

H. D. SHIELDS, *Pub. Com.*,
484 Roxborough Avenue, Phila, Pa.

Reunion of class of 1916, Tuesday, April 19, 1921. All out and as you were.

D. H. SIMMERMAN,
1010 W. Lehigh Avenue, Phila., Pa.

Pennsylvania State Dental Society

The fifty-third annual meeting of the Pennsylvania State Dental Society will be held in the Bellevue-Stratford Hotel, Philadelphia, Pa., May 3, 4, 5, 1921. An interesting and instructing program has been prepared. All ethical practitioners are invited to be present.

W. L. FICKES, *Secretary*,
East End Trust Bldg., Pittsburgh, Pa.

Massachusetts Dental Society

The fifty-seventh annual meeting will be held in Boston, Mass., at the Hotel Somerset, May 4, 5 and 6, 1921.

A cordial invitation is extended to all members of recognized dental societies.

W. VERNON RYDER, *Secretary*,
175 Newbury Street, Boston, Mass.

Vermont State Board

The next meeting of the Vermont Board of Dental Examiners for the examination of candidates to practice in Vermont, will be held at the State House, Montpelier, June 27, 28, 29.

Candidates will present for registration and preliminaries at 10:00 A.M., Monday the 27th.

To be eligible for examination a candidate must be: *First*, twenty-one years of age; *second*, a graduate of a high school of the first class; *third*, a graduate of a reputable dental college.

Applications must be in the hands of the secretary not later than June 20th.

For further information and application blank, address

HARRY F. HAMILTON, *Secretary*,
Newport, Vermont.

Tennessee State Dental Association

The fifty-fourth annual meeting of the Tennessee State Dental Association will be held at Nashville, May 17, 18, 19, 20, 1921.

J. J. VAUGHN, D.D.S.. *Chairman Pub. Com.*,
Nashville, Tenn.

The Board of Dental Examiners of Alabama

The Board of Dental Examiners of Alabama will meet Monday, June 20, 1921, at nine o'clock A.M., at the Birmingham Dental College, Avenue F and 20th street, Birmingham, Alabama, for the purpose of examining applicants who hold diplomas from reputable dental colleges, for certificate of qualification to practice dentistry in Alabama.

All applications accompanied by the examination fee must be filed with the secretary-treasurer at least one week before the examination. For further information, application blanks, etc., address

H. CLAY HASSELL, *Secretary-Treasurer*,
616 22nd Avenue, Tuscaloosa, Alabama.

South Dakota State Dental Society

The annual meeting of the South Dakota State Dental Society will be held in the Coliseum, at Sioux Falls, South Dakota, March 28 to April 2, 1921. Post-graduate instruction will be features.

A cordial invitation is extended to all members of the National Dental Association. Very truly,

ERNEST W. ELMEN, *Secretary*,
Suite 608 S. F. National Bank Bldg.,
Sioux Falls, South Dakota.

Iowa State Board

The Iowa State Board of Dental Examiners will meet for the purpose of examining candidates for a license to practice in Iowa, at Iowa City, College of Dentistry, beginning Monday, June 6th, 1921, at 9:00 A. M.

For further information and application blanks, address,

DR. C. B. MILLER, *Secretary*,
726 Fleming Bldg., Des Moines, Iowa.

Kansas State Board

The Kansas Board of Dental Examiners will meet a Wichita, Kansas, June 13th, beginning at 7:30 P. M. for the examination of applicants for license and the transaction of any other business that may come before the board. For application blanks and any other information, write,

G. F. AMBROSE, *Secretary*,
111½ South Main St., Eldorado, Kansas.

Illinois State Board

The 57th Annual Meeting of the Illinois State Dental Society will be held in Peoria, Illinois, May 10, 11 and 12, 1921.

The officers of the society are as follows:

President, J. P. Luthringer, 608 Jefferson Bldg., Peoria, Ill.; vice-president, C. W. Coltrin, 208 N. Mason Ave., Chicago, Ill.; president-elect, F. B. Noyes, Peoples Gas Bldg., Chicago, Ill.; secretary, Arthur G. Smith, 511 Central Nat'l. Bank Bldg., Peoria, Ill.; treasurer, T. L. Grisamore, 29 E. Madison St., Chicago, Ill.; librarian, G. H. Henderson, 340 N. Central Ave., Chicago, Ill.

Fraternally yours,
ARTHUR G. SMITH, *Secretary*.

Northern Ohio Dental Association

The 1921 meeting of the Northern Ohio Dental Association will be held at Hotel Statler, Cleveland, Monday, Tuesday and Wednesday, June 6, 7, 8, with a rattling good program, "per usual," to be followed by a P. G. course conducted by Dr. Dayton D. Campbell for the remainder of the week. Keep your eye on the N. O.

NEWS and OPINIONS

CONDUCTED BY G. E. HARTER

To Program Committees, State and District Dental Societies:

In response to a very obvious and often-expressed need, the management of THE DENTAL SUMMARY has undertaken the organization of what may be termed a clearing house or lyceum bureau for the purpose of bringing together those who are in want of convention talent and those who are able to supply the demand.

Program officials often are driven to their wits' end to know just which way to turn in their search for men who have fitted themselves by study and experiment to place before their societies material that may advance the cause of dentistry, while many able men are forced to remain in obscurity because no avenue for expression seems open to them.

Another consideration that has had weight with us is that the few well-known men are in such constant demand that some of them find it almost impossible to devote time to their practice necessary to earn a satisfactory livelihood unless they decline many invitations. This they feel that they have hardly the right to do, being imbued with the true professional spirit of service.

Both these conditions operate unfavorably with regard to the advancement of the profession, and both we hope in some measure to remedy by and through the organization and operation of our Dental Lyceum Bureau.

The plan has not as yet been worked out in all its details, if, indeed, much of a detailed plan is necessary. The aim is, however, to secure registration in the office of THE DENTAL SUMMARY, of the names and addresses of all men who feel themselves able to contribute to the sum of dental knowledge by means of papers, discussions, lectures, demonstrations and clinics, together with their subject or subjects, method of presentation, terms, and such other information as program committeemen and other officials are likely to require, and then to place this information in the hands of those who need it in the work of preparing programs.

If we can secure sufficient cooperation to enable us to carry out this purpose, we shall have accomplished a work that cannot but prove to be of great assistance to society officials as well as to members of the profession who are both able and willing to serve on convention programs.

Below will be found two coupons, one to be dated, filled out, signed and returned by officials, and the other by men who feel themselves able and are willing to leave home and practice often enough and long enough to attend meetings, and place the results of their knowledge and attainments in the hands of their fellow-practitioners.

Form 1. (For Program and Clinic Committees).

The Dental Summary Lyceum Bureau:

The next meeting of the.................. Dental Association (or Society) will be held at

....

on..

We shall be glad to have you send to us names, addresses and terms of the following:
(Check before kind of talent wanted)

..Lecturers ..Essayists ..Clinicians ..Demonstrators on these subjects:

Operative Dentistry:

..Orthodontia ..Exodontia ..Oral Surgery ..Root Resection, ..Antrum Operations, ..Impactions, ..Supernumerary Teeth.....

Prosthetic Dentistry:

..Denture Prosthesis, ..Impression Taking, ..Investing, ..Casting, ..Fixed Bridges, ..Removable Bridges, ..Partials..........

..*Anesthetics and Anesthesia.*

Therepeutics:

..Pyorrhea, ..Abscessed Roots, ..Foci of Infection, ..Syphilis; its Manifestations and Management Dentally, ..Obscure Mouth Troubles.

Oral Hygiene:

............, ..., ...

Office Management

..Practice Building, ..Finance.

Name..............................

Official Position....................

......................Dental Society

Address...........................

Form 2. (For Lecturers, Essayists, Clinicians, Etc).

The Dental Summary Lyceum Bureau:

I have made a special study of the following topics in Dentistry and am prepared to appear before Dental Societies within .... miles of my home for the purpose of giving ..Papers, ..Lectures, ..Clinics, ..Lantern Demonstra-

tions, ..Discussions, ..., ...
on the following subjects: ....
....
....
My terms are: One day, $......, two days, $......, Post-graduate Course, three or more days, $...... (State limit of number in class if you require a limit). It is understood that my total expenses are to be paid in addition to my fee.

In case no charge is made except enough to cover travelling and hotel expenses, check this paragraph.

(If you are well known in public work, the following blanks need not be filled).

I have appeared before the following societies during the past two years:

....
....
....
....

Name..........................
Address.........................
Member of.................. Society

So far as Associations and Societies are concerned, our work in developing and conducting this Bureau shall be entirely gratis. We are glad to do all within our power for the common cause.

Neither do we ask any compensation from individual dentists who register with us so far as our work is concerned. However, as considerable expense is involved, we have decided to make the following terms:

Blanks for registration must be accompanied by one year's subscription to THE DENTAL SUMMARY If the registrant is already a subscriber, his subscription will be extended one year. In all cases in which the registrant offers his services free of charge, or for no other compensation than travelling and hotel expenses, this will be the total charge. In all cases in which a fee is paid for services, in addition to railway and hotel expenses, our charge will be five per cent. of the amount of such fees. Should amounts paid to us exceed the cost of conducting the bureau, the excess will be returned to those paying our charges.

Here is the plan in outline. If any reader has any suggestions to make, we shall be glad to have them. Our sole object is to be of service to the profession, and to those overworked officials of societies who usually receive only criticism for not doing the impossible.

(I shall be glad to have letters on this subject addressed to me personally).

Every dentist in Martin's Ferry, Ohio, is donating half-day each week to school clinic.

The midsummer meeting of the Kentucky West-Central will be held at Dawson Springs. No date announced. Dr. Oscar Flener, Hopkinsville, is secretary.

Dental burglaries at this time are confined largely to narcotics. Burglars haven't time to bother with gold and such, with koke bringing its present prices.

Keep your eye on Dr. Percy R. Howe. He is saying things that are very well worth hearing and heeding. While he is not yet ready to admit that health and sickness depend wholly upon diet, he does say that dental caries depend to a far greater extent upon the dietary than upon fermentation of sugars and starches. A diet of skim milk and rolled oats offers a premium for decay of the teeth, while such foods as are high in vitamines, fats, etc., arrest it. Some of these days the relation of diet to health and efficiency is going to be better known than it now is; and then the human race will begin its long march toward mental, moral and physical perfection.

The Steubenville District dentists have organized a study club. If you haven't one in your vicinity, get busy.

England has withdrawn her prohibition of dental practice by women, caused by immense loss of men in the war.

Dental specialists for children offers a field that students should consider. There is an opening for a children's dentist in every large city in America.

If you are interested in dental photography for illustrative purposes, for making slides, etc., from model or film, write to Mr. Sid. Martin, care THE DENTAL SUMMARY. He is making a study of dental needs along these lines and can be of help to you. As an artist he has few equals. Let him work out your picture problems for you.

Rochester Dispensary gave a total of 119,533 treatments to 63,528 children during 1920, at a cost of $89,632.37. The budget for 1921 calls for an expenditure of $95,950.

A New York Dentist admitted in court the other day that he had spanked his wife, and stated that she needed it. It is my opinion that if more wives were kindly and systematically spanked at the precise psychological moment, there would be more happy homes and less work for divorce courts. Woman may be man's equal, all right; but her mental processes are different, and, at times, may be best stimulated and guided by the light sole of a slipper, well laid on. Unpopular doctrine? Of course; but I'd rather be unpopular than irrational.

I have been asked to express my opinion of the lengthened course in dental colleges. If interested, you'll find that opinion in another place in this issue. If anybody can show me how a decreasing body of practitioners can spread itself out thinly enough to serve an ever-increasing population without very seriously affecting the health and efficiency of that population, I am ready to reverse the opinion there expressed. Looks to me as though the average man must soon be satisfied with extraction at the present rate. I have been waiting for four months to get into my dentist's chair, with prospects growing no brighter very fast.

IF IT'S GOLD

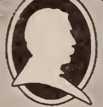
AND is used in dentistry, Ney makes it. And no matter what the item may be, it has the degree of fineness represented, and uniform working properties.

We are now making for the dentists of America a greater variety of PRECIOUS METAL PRODUCTS *than all other manufacturers combined.*

Not a Boast but the Statement of a Fact

And the word "NEY" stamped on a package or its contents has always meant—and shall always mean—intrinsic value and integrity of manufacture.

THE PIONEER



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NEW GOLD FOR
PRECIOUS METAL PRODUCTS
OLD GOLD, SILVER
PLATINUM ETC.

Viscount Grey, of "scrap of paper" fame, was recently relieved from almost total blindness by an operation performed by an American dentist during a visit to Washington. Lord Grey now hopes to become again a power in politics.

Set it down for an assured fact that any attempt to bring about a disagreement between America and England or any other of her recent allies in the world war, is Hun propaganda, pure and simple. I hold no brief for England. My ancestors fought her as ably, possibly, as those of any other man, not only here in America but on the fields and in the courts of Europe. But I am not so foolish as to hope for permanent peace throughout the world in any other way than through a tacit union between English-speaking peoples. Such a union, even though not expressed through a formal alliance, would be a constant and effective barrier to aggression from any source. Does anybody suppose that the wild Hohenzollern ever would have had the hardihood to provoke a war with England had it been understood that America's sword only awaited England's call? I have my own ideals, which do not point toward war; but at the present stage of civilization the iron hand in the silk glove seems to me to express conditions necessary to peace.

More men of fifty find themselves facing declining powers through the lack of physical exercise between thirty and forty years than from any other one cause. Neglect of teeth during the same period must be paid for later.

The national convention of the Psi Omega fraternity will be held at Milwaukee, in August, during the meeting of the National Dental Association.

During the year 1920, only 800 persons were able to qualify for the practice of dentistry, while about 1000 old practitioners either died, retired, or engaged in other callings. At this rate, how long will it be before dentistry becomes a luxury available only to the very few? Think it over.

A Connecticut court has decided that a bridge is a fixed part of a man's anatomy, and that a wearer is entitled to pay for necessary repairs under the workman's compensation law.

The Chicago convention was surely a highly successful affair, not only in point of record attendance but also in the manner in which the meetings were handled. Everything moved with clock-work precision and regularity, and an immense amount of business was transacted, in addition to a most unusual group of professional papers, lectures and clinics.

Announcement

THE CARMICHAEL CLINICS
614-615 Wells Building
MILWAUKEE

The next regular Post-Graduate Class under Dr. J. P. Carmichael will be held during the week commencing April 18, 1921.

This course will be given at Dr. Carmichael's office, and comprises one full week of clinical instruction covering work in the Carmichael Inlaid ¾ Crown, Pyorrhea Treatment, and the Principles of Prophylaxis. The cost of the course is one hundred dollars. Classes are limited.

CUT OUT AND MAIL COUPON BELOW

DR. J. P. CARMICHAEL, Milwaukee, Wis.

Check Here ☐ Please enroll me for a membership in your clinical course for the week commencing

....

Check Here ☐ Please advise me what date the next class will be held.

(Signed) ....

Address ....

A study club has been formed at Rockford, Ill. No town is too small for systematic study of dental problems. Cooperation is the word of power today.

Northwestern University Dental School is one of ten institutions recently selected by the U. S. government for the training of men for service in the Reserve Officers Training Corps. More than 100 men registered February 12 for the four-year course.

War is still raging up in Washington over the proposed new dental law, making a diploma from a recognized dental college a *sine qua non* for examination and license by the State dental board, with the "Ethics," and "Non-Ethics" arrayed in opposing camps. The so-called "advertisers" are fighting the bill with all their might. It seems to me that any practitioner really imbued with the spirit of service would be willing to lend his aid to the passage and enforcement of any law tending to increase the efficiency of members of his profession, while protecting the public against the dangers of incompetent and uneducated operators.

Illinois State Society meets at Peoria during the second week in May. May is becoming the month of choice for dental societies, Illinois, Indiana and Tennessee occurring in that month, two of them on identical days, which makes life a little strenuous for those whose duty requires their presence at all of them.

It is stated by those supposed to know that dentists in the U. S. use gold to the value of $30,000,000 per year. That's more than I have.

Watch the Northern Ohio fellows. At present rate of stepping that organization will soon make itself famous for its conventions. At this early date the program for the June meeting is completed, and will soon be announced in detail.

Oklahoma is trying to bring about dental inspection in public schools. There shouldbe no trouble to effect that purpose in a state noted for its progressiveness.

As the latest move in the dental law controversy in Washington, it is now proposed to repeal all dental laws on the statute books of that state and pass another to take their place, providing, among other measures, that any dentist who has practiced in the state for ten years may take the required examination and secure a license if competent, no matter whether he ever graduated from a college or not. It is said that such a law will satisfy both sides.

Good Work in Toledo

In a suite of bright, cheerful rooms where one gets relief from an aching tooth, or purchases a new set at a convenient price, the workers in the Toledo Dental Dispensary Association are accomplishing great work among the needy folk of the city.

The dental rooms are located on the first floor of the Adams Street Mission building, 572 Ontario street and have been established there since October 1.

Dr. E. E. Meyers, formerly of Chicago, is in charge. The dental dispensary association is the direct result of a campaign for better teeth for people who cannot afford to pay high-priced dentists. Mrs. Zorah Bowman is president.

No matter what service you need—whether it is a new set of teeth, a few crowns, fillings, extractions or just treatment—the price is fixed so you can pay it. And if you can't pay it—well there's nothing more said about it.

The association is supported by the Toledo Community Chest.

Payments from five cents to fifteen dollars have been received on bills which would ordinarily amount to from five to one hundred dollars.

While children in the public schools are cared for at dental clinics, this arrangement does not include children in parochial schools.

In an effort to care for these children, Catholic dentists will form a group to visit the schools and inspect the teeth of school children. They will be in charge of Dr. R. H. Vollmayer. A similar organization among Lutheran dentists will be formed.

Worry over an ever-increasing load of debt has unfitted many a man for that keen attention to his work or business that is essential for advancement, and eventually has resulted in casting him out upon the world a broken man, bringing misery not only to himself but to his family. Get out of debt and keep out.

EAGLE "MIKADO" Pencil No. 174
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ASK FOR THE YELLOW PENCIL WITH THE RED BAND
EAGLE MIKADO
EAGLE PENCIL COMPANY, NEW YORK

Millions for Appearance

Scenes like this have a Meaning of great importance to the Dentist who is thinking of Success

All down the ages mankind has evinced a consuming passion for Appearance.

The Aborigine daubing his naked body with colored clays, twisting gaudy feathers in his hair, and staining and filing his teeth, was only the forerunner of modern man who is just as intent on self-adornment as was the unlettered savage.

Today we are spending millions upon millions for adornment—for Appearance.

As we have put off the crudities of the past, we have learned that Nature has given us the essentials of true personal beauty; if, to a good form, a clear complexion and abundant hair, she adds fine teeth—*and the greatest of these is teeth!*

Trubyte

—*an Investment in Appearance*

Of all Nature's gifts to Beauty, the teeth are the most important because not only do they "make" the face, but Health itself depends on them.

The premature loss of teeth has affected the social aspirations of many women and limited the business growth of many men.

There is an undoubted reward awaiting the dentist who will carry his prosthetic work beyond the mechanical stage to the point of *true restoration*—of Appearance as well as function.

With "Beauty Parlors" making millions through their *superficial* aids to Appearance, is it not time that dentists realized the tremendous opportunity which is offered them through the harmony of face and tooth form offered in Trubyte Teeth, combining *Beauty* of Appearance with *Efficiency* in Mastication?

To stay the hand of Time; to erase the ravages of Disease; to restore Appearance and Health is surely more important and worthy of reward than the twisting of hair and painting of skin.

Then—view your service in the full light of realization, dignify it with its proper value—*and reap the inevitable reward.*

RESTORATIONS T THAT RESTORE

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The DENTISTS' SUPPLY COMPANY

220 West 42nd St. New York

American Institute of Dental Teachers

At the annual meeting of the American Institute of Dental Teachers, held at Indianapolis, Indiana, January 24, 25 and 26, the following officers were elected for the ensuing year:

President, Guy S. Millberry, University of California, San Francisco, Calif.; vice-president, A. H. Hipple, Creighton University, Omaha, Nebr.; secretary-treasurer, Abram Hoffman, 381 Linwood avenue, Buffalo, N. Y.; executive board, A. E. Webster, Royal College of Dental Surgeons, Toronto, Ont., one year; E. D. Coolidge, University of Illinois, Chicago, Ill., two years; H. E. Wheeler, College of Dental and Oral Surgery, New York City, three years.

The next meeting will be held the third week in January, 1922, at Montreal, Que.

Indianapolis, Ind., January 26.—A committee was appointed to investigate the proposal to place all dental schools under the administrative control of a university. This proposal was in no sense mandatory, but simply expressed the willingness for the institute to consider such a steer. Dr. F. B. Noyes ,of University of Illinois, read a paper "Teaching Orthodontia."

"Improvement in teaching in the last twenty-five years has been the reason for improved dental practice," he said, "but the improvement in the teaching of orthodontia has been slight. Regular orthodontic clinics ought to be established to arouse interest in this important branch of dentistry, but all dental colleges have failed so far to teach it efficiently."

Discussion of the paper was led by J. A. C. Hoggan, of the Medical College of Virginia, and C. R. Jackson, of the Indiana Dental College.

A. C. Fones, director of the Bridgeport (Conn.) Hygienists School, read a paper on "The curricula for Mouth Hygiene Schools."

At the session Tuesday afternoon Ellison Hillyer, of the New York College of Dentistry, read a report on the commission on textbooks; E. D. Coolidge, of the University of Illinois, gave the report of the commission on nomenclature, offering suggestions for titles for courses to be used in catalogues; Abram Hoffman read a report of the dental index bureau and Dr. Millberry read a report of the committee appointed to investigate the Smith-Towner bill and its relation to phases of dental education. He suggested that the institute should try to obtain its share of the money appropriated for educational purposes.

Dentistry and Anesthesia

While various experiments had been made with so-called "laughing gas" or nitrous oxid gas in America prior to 1846, it was some seventy-four years ago that the first practical operation under ether was performed in the Massachusetts General Hospital in Boston, and the peculiar part of it was that the sulphuric ether was given, not by one of the house physicians, but by a young dentist who had been experimenting on himself and had gone to sleep for eight minutes. He rushed over to the hospital and asked a chance to demonstrate his discovery. A man about to have a tumor removed from his neck gave permission to have the "new-fangled dope" applied. Dentist

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1. Cannot be made to leak past its piston;
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3. Dosage at all times plainly visible;
4. Long life assured by fact that ground fit of piston and barrel is *glass against glass;*
5. Metal end plug is same co-efficient of expansion as glass barrel.

Morton went to work and the tumor was removed. The patient opening his eyes after the operation cried, "Gentlemen, this is no humbug," and with that remark ether was given to the medical world.

Oliver Wendell Holmes came forward with names for the process and the liquid, and the dictionary gained "anesthesia" and "anesthetic." In three months the drug was being used throughout the civilized world.

Extension of Dental Course

Following is a brief review giving some reasons why in my opinion the course in dentistry should not be extended to five years:

The number of dentists in recent years has not increased apace with the demand for dental services. Except in the large cities there has been practically no increase in the number of dentists in the last ten years.

To increase the course to five years would place dentistry beyond the reach of many who need it most. It is quite probable that a large proportion of the students on entering college choose the dental course because they cannot afford the time and money required for a course in medicine or law.

The men who consider time and expense are often those who are obliged to make their own way, and these men usually make the most diligent students, and finally, on the average, the best dentists.

A further extension of the course would lose to dentistry some of the most desirable recruits and soon result in an acute undersupply of dentists, especially for the middle and poorer classes. A shortage of dentists will soon result in driving the cost of good dentistry beyond the reach of the family with an average income.

Dentists like others are inclined to sell their services to the highest bidder and relieve themselves of the poorer families by establishing fees beyond their reach. The effects of this have come strongly into evidence during the past few years.

If dentistry is placed on an even basis with law and medicine, more students will select these better-known professions and fewer enter dentistry.

While the requirements of a complete dental education have greatly expanded, this is partially relieved by the tendency to refer the more difficult branches to specialists and the most necessary dental requirements of the general public are still quite simple.

While more study and preparation would be an advantage, prolonged preparation is not of such major importance as in medicine, for the dentist seldom deals with problems involving life or death; in fact it seldom involves the general health except as a result of neglect, and neglect would surely be increased by any action that limited the number of future dentists.

A five-year course would gain for dentistry more recognition from the medical profession, but would put dentistry in a position where it could not cope with the rapidly increasing demand for dental services.

It might be to the advantage of the profession and the public if a few of the Universities would adopt a five-year curriculum for those who desired to go farther in special branches of dentistry, and prepare as specialists, or to serve in general practice those who can afford the more advanced and necessarily expensive types of service.—*G. E. H.*

Ohio—Central

Marion, Ohio, February 3.—The Central Ohio Dental Association met here Wednesday, with F. P. Leonard, of Bucyrus in charge and L. T. McKinney, of Richwood as secretary. Business was transacted and the following officers named for the coming year.

President J. Pfannstiel, of Delaware; first vice-president, R. C. Bratton, of Galion; second vice-president, Z. B. Houghton, of Marion; treasurer, F. C. McGaughey, of Galion; recording secretary, L. T. McKinney, of Richwood; corresponding secretary, M. Mills, of Delaware.

J. P. Henahan, of Cleveland and F. C. Starr, of Columbus were the afternoon speakers. Dr. Henahan on "Oral Surgery and Impactions," and Dr. Starr on "Crown and Bridge; Cast Gold Clasps."

Michigan—Houghton County

Houghton, Mich., January 19.—C. W. Messinger, of Houghton is the 1921 president of the Houghton County Dental Society. This selection was made at the annual meeting of the society.

The officers elected were as follows:

President, C. W. Messinger, Houghton; vice-president, E. L. Chaput, Hubbell; secretary-treasurer, W. W. Kimmel, Hancock; program committee, A. P. Whittemore, chairman; N. B. Fox, R. P. Neil and A. L. Chaput.

Indiana—Fort Wayne

Fort Wayne, Ind., January 21.—Fort Wayne dentists who are members of the Isaac Knapp Dental Coterie held an all-day meeting yesterday ending with a dinner and dance at which their wives and ladies were present last evening.

During the morning a business session was held, with W. E. Neuenschwander presiding as chairman.

In the afternoon W. E. Harper, of Chicago gave a talk on clinic work in the course of which he gave a number of practical demonstrations. Talks were also made by several local dentists.

In the evening the doctors entertained their wives. Following the dinner, short talks were given by E. E. Quivey, J. H. Thompson and J. C. Link. The principal address of the evening was given by H. L. Smith, of Indianapolis.

Miss Mary Marriot. president of the auxiliary to the coterie, composed of the office girls in the dentists' offices, gave a brief talk on the object of the auxiliary and the closer cooperation wrought by the organization between the doctors and their clerks.

"Clinic on Wheels" in Pennsylvania

Philadelphia, Pa., January 24.—The creation of a dental division of the Department of Health at Harrisburg brings to prominence the work in the field of preventive dentistry by a former Philadelphia dentist, Dr. Clark Judson Hollister, who is at the head of the new division.

The dental division was created following experiments made by Dr. Hollister in the rural schools of the State. For a year he toured through a number of Pennsylvania towns in a unique "dental clinic on wheels," accompanied by two dental assistants. In each town he visited the fourth and fifth grades of the schools and put the children through a thorough dental examination, after which they were sent to the clinic for such work as was needed.

The attractive little white "ambulance," standing in the schoolyard, attracted the attention of the villagers wherever it went, and left behind a reawakened sense of the importance of clean teeth.

A number of startling facts were discovered because of the work of the traveling clinic. It was found incorrigible school children in many instances became tractable after their dental difficulties had been patched up. It was found the children in most instances took a new pride in their work and their appearance when they acquired the "daily tooth-brush habit." These discoveries won the interest of health authorities and School Boards throughout the State, and the recently-created dental department is the direct result.

Many cities throughout the Nation have taken the matter in hand and have provided departments of dental health through which the children of the public schools are given complete dental examinations along with the usual physical examination, but Pennsylvania is the first State to undertake the work and to make a place for it in its Department of Health.

The story of the "dental parlor of wheels" is in itself interesting, particularly to Philadelphians. Mrs. George Childs Drexel, of this city, was largely responsible for the fitting out and financing of the automobile. It was during the Mexican border trouble, when troops were being rushed south as fast as they could be mustered together, that tales of inadequate provisions and much-needed supplies and distressed stories of the suffering of soldiers because of lack of dental equipment, that Mrs. Drexel conceived her idea.

Believing that something should be done, Mrs. Drexel, with other prominent Philadelphians, fitted out the dental parlor ambulance and sent it south together with Dr. Hollister. The machine traveled back and forth over the border wherever the tropos were stationed.

Never owe anybody more than you can pay without cramping yourself, and never allow anybody to owe you more than you easily can afford to lose.

You Can Get Results

Anyone can get perfect results with the

Adams X-Ray Unit

Write for our Literature

PHYSICIANS and Dentists together use the machine for general radiographic work, for bone detail with splendid results.

Built of the best of materials throughout and because of its design adaptable to any office condition, it fills a long felt want.

The spring-tension counterbalanced arm with the Adams tube holder and mounting, makes obtaining any angle possible easily and quickly. The size of the cabinet and arm construction concentrates the complete Unit in a space not more than twenty inches square.

All guesswork eliminated in taking radiograms—permitting standardized technic and a consequent exceptionally high percentage of perfect results.

ADAMS X-RAY COMPANY
1020 Maple St., Detroit, Mich.

Shortage in Dental Ranks

Indianapolis, Ind., January 25.—A noticeable shortage in dentists throughout the country is threatening the best interests of the profession, according to Dr. Arthur Black, of Northwestern University, who spoke on "Progress of Dental Education" yesterday at the twenty-eighth annual meeting of the American Institute of Dental Teachers at the Claypool hotel. He said that there are only 40,000 dentists in the United States to take care of the 105,000,000 people and that the number of dentists at work is not increasing in proportion to the increase in population. The war is said to have cut heavily into the dental ranks.

Rhode Island—State

Providence, R. I., January 19.—Dr. William R. Burke was elected president of the Rhode Island State Dental Society at the closing session of the two-day annual meeting, held in the Narragansett Hotel last evening. A dinner was served at which Lieutenant-Governor Gross was a guest.

Other officers are: Vice-president, F. L. Miller, Woonsocket; secretary, Ambrose Lynch; treasurer, Howard W. Church, Bristol; executive committee, Herbert P. Beckett, Joseph P. Massicotte, Henry A. Martin; librarian, Charles Cole.

H. E. Friesell, dean and professor of operative dentistry in the University of Pittsburgh, and John H. Biddle, of Pittsburgh, professor of clinical pathology and orthodontia in the same institution, both were made honorary members of the Rhode Island Society and received the honor medals of the society for work done in furthering the science of dentistry. They both were guests of honor at the annual dinner. Ernest A. Charbonnel, retiring president, was installing officer.

National—Local Committees

Milwaukee, Wis., February 2.—Committees have been appointed to look after local arrangements for the great national meeting in August. Following are the chairmen:

C. W. Hall, general chairman; Adolph Gropper, clinics; William H. Cudworth, illustrated clinics; Edwin A. Flancher, exhibits; Harry L. Banzhaf, halls and hotels; Harry G. Morton, publicity; Otto G. Krause, entertainment.

Coming Events

March

Kansas, at Wichita, (21-26).
South Dakota, at Sioux Falls, (28 to April 2).
Vermont, at Rutland, (16, 17, 18).

April

Alabama, at Montgomery, (12, 13, 14),
Connecticut, at Waterbury, (19, 20, 21).
Kentucky, at Louisville, (13, 14, 15).
Michigan, at Detroit, (11-16).
Missouri, at Springfield, (25, 26, 27).
West Virginia, at Bluefield, (11, 12, 13).
Philadelphia Alumni at College Building, Philadelphia, (20).
Atlantic City Alumni of Dewey School of Orthodontia, Hotel Ambassador, Atlantic City, (25, 26).

May

Arkansas, at Little Rock, (no date given).
Illinois, at Peoria, (10, 11, 12).
Indiana, at Indianapolis, (16, 17, 18, 19).
Iowa, at Des Moines, (3, 4, 5).
Massachusetts, at Boston, (4, 5, 6).
Nebraska, at Omaha, (no date given).
New York, at New York City, (11, 12, 13, 14).
Tennessee, at Nashville, (17, 18, 19, 20).

DEATHS

At Pittsburg, December 12, Dr. Joseph N. Katz, aged 45.

At Fargo, N. D., December 14, Dr. David B. McLain, aged 76. He was commander of the State G. A. R.

At Lancaster, Pa., January 19, Dr. Samuel Zell, aged 75.

At Houston, Texas, January 19, Dr. Theodore F. Boyd, aged 63.

At Chicago, January 31, Dr. Emmanuel Kargau, aged 57. He was formerly instructor in dental surgery at Northwestern.

At Dyersburg, Tenn., January 18, Dr. J. W. Peden, aged 57.

At Boston, Mass., January 31, Dr. Wallace B. Keeney, aged 85.

At Chicago, January 29, Dr. Edward Hartford, of Portland, Ore., following an operation.

At Sparta, Tenn., January 21, Dr. Andrew Trogden.

Classified Advertisements under this heading, $2.00 each for 60 words or less; additional space, 2 cents per word, single insertion; three insertions or more, special rate on application.

$1,000 FOR $1.00—Send me $1.00 and I will send you complete details of strictly ethical advertising scheme that will bring you hundreds of dollars in business within one week. Money refunded if scheme does not meet with your notions. Write: Dr. S. Gross, 320 New Jersey Bldg., Duluth, Minn. (Member of District, State and National Association. 310P

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Local Treatment in
PYORRHEA
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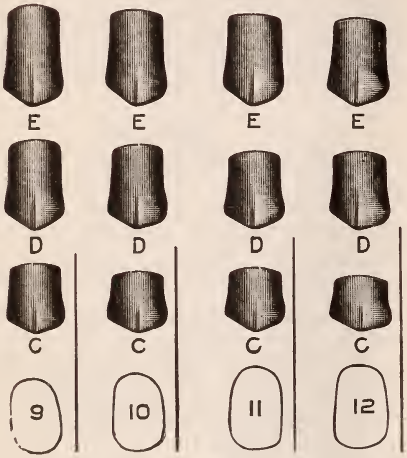
New York

Masel's Seamless Ready-made Gold Crowns

22K. 29-Gauge



Prices: C—$1.00 D—$1.20 E—$1.35

MASEL'S Seamless Ready-made Gold Crowns are time and money savers. They save time of taking impressions and making models. Just imagine, no impressions are required; simply prepare the tooth, select a gold crown of proper shape and size, fit over the tooth and to articulation, trim to gum outline and the crown is ready for cementing. Sell all the time you save!

These crowns are made by semi-automatic machines, which produce crowns uniform in thickness, size and weight.

These Crowns are Stocked by

L. D. Caulk in all their depots.	S. S. White, Atlanta.
Climax Dental, Phila. and Scranton	S. S. White, Philadelphia.
Dental Mfgs. Supply Co., Phila.	Osmun-Cook Co., Newark
M. Feldman & Co., Pittsburgh.	Hart & Friend, Baltimore.

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Masel Dental Laboratory

214 S. 12th Street Philadelphia, Pa.

REGULAR CONTRIBUTIONS

THE DENTAL SUMMARY
THE MAGAZINE THAT HELPS

Vol. XLI April 1921 No. 4

THE CONTINUOUS GUM DENTURE*

BY DAYTON DUNBAR CAMPBELL, D.D.S., KANSAS CITY, MO.
SPECIAL LECTURER DENTAL PROSTHESIS, KANSAS CITY WESTERN DENTAL COLLEGE;
FOUNDER AND PRESIDENT OF CAMPBELL SCHOOL OF PROSTHETIC TECHNIC

(Continued from page 228 March DENTAL SUMMARY)

THE PLATINUM BASE PORCELAIN GUM DENTURE is the *ne plus ultra* of the prosthetic art; it is the highest product of the artist prosthetist's skill. It offers opportunity for the full exercise of artistic genius, embodies a genuine appreciation of the esthetic, and gives its wearer the consciousness which accompanies possession of the best.

Platinum does not tarnish and in this respect is superior to gold; the porcelain is of mineral origin and therefore more enduring than dentures dependent upon the vegetable world.

The porcelain gum is more cleanly than that of other dentures because its highly glazed surface does not encourage the formation of plaques, while the denture when properly treated may be rendered impervious to the fluids of the mouth, thus resulting in one that is highly sanitary.

It is almost impossible to over-emphasize the prosthetist's service to mankind, since, in supplying these dentures, he is able not only to restore beautiful features along with masticatory efficiency, in such manner as to enable the artificial substitutes to defy detection even within close conversational range, but also at the same time assists in transforming timidity into temerity, in banishing embarrassment, in relieving the patient of a consciousness of self, and thus contributes immeasurably to the enjoyment of social intercourse and largely increases one's satisfaction in life.

In view of the character of the materials he is able to supply, the incomparable inspiriting effects upon the patient, and the prosthetist's gratification in being permitted to render the highest service within the scope of his art, it is one of the enigmas of dentistry that few patients learn of the superior merits of these dentures. Few patients come to the office wearing linsey-woolsey or garbed in overalls, yet the majority of dentists insist upon supplying them with the linsey-woolsey quality of dentures. They seem to know nothing but vulcanite.

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*This is the twelfth of a series of twelve articles written by Dr. Campbell, especially for THE DENTAL SUMMARY.

*EDITOR'S NOTE: Discussion of the principles or methods presented in this series of articles on Prosthetic Dentistry will be welcomed by the author. All correspondence in this connection should be addressed to Dr. Dayton D. Campbell, Shukert Building, Kansas City, Mo.

This is probably the explanation: The dentist is not enthusiastic about the surpassing qualities of the platinum-base porcelain gum denture because he is not aware of them; he has no continuous gum case to show his patient and is unable to talk intelligently about its advantages. If he does appreciate the superior merits of this denture, he fancies that its construction is a formidable and forbidding undertaking, while the truth is that its construction is not as difficult as vulcanite.

In taking an impression for the continuous-gum denture the prosthetist should exercise the attention to detail that he displays in taking an impression for any denture. While close adaptation, proper compression of the tissues, and peripheral seal are always sought in taking impressions for any kind of denture, the heavier the base the more imperative the demand that full advantage of all of these factors be secured in the interests of the best retention possible.

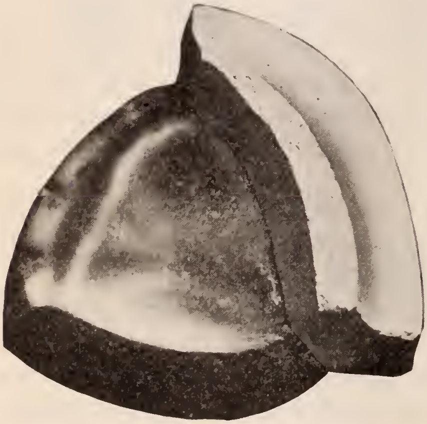
Fig. 1

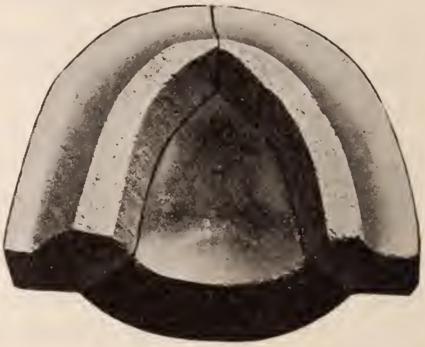
Fig. 2

Fig. 1—First section of plaster impression.
Fig. 2—Two sections of plaster impression.

The Spence cast is poured in the usual manner; it is subsequently varnished over the entire surface, after which sections of crown and bridge investment are built up around it in such a manner that, when reassembled, the portions will interlock to give a compact impression. These sections are poured as follows: Starting at one tuberosity and extending to the median line constitutes one section; it covers the crest of the ridge and extends down to include the Spence cast, forming a section three-fourths of an inch in thickness. (*Fig. 1*). When hardened, the surface of this segment is coated with thin liquid silex and the corresponding segment of the opposite side is poured in similar manner. (*Fig. 2*). The interlocking feature is provided through slightly beveling these sections outward (viewed palatally) from the inside and the outside portion downward, so as to leave, instead of a sharp ridge, a flat surface one-fourth of an inch wide extending full length along the top. (*Fig. 3*). These beveled surfaces are coated with silex, and the palatal surface is then poured, allowing the material to cover both the inner and the outer beveled surfaces, which thus provides a sectional cast that may be reassembled accurately and compactly during the several operations which require it. (*Fig. 4*).

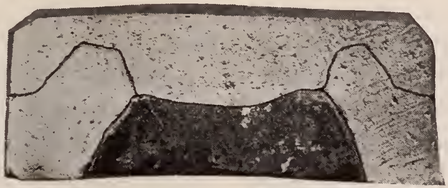

Fig. 3—Top section, also showing inter-locking feature.

The border which determines the thickness of the die may be cut down to a suitable height; it is then placed upon a sheet of sandpaper resting upon a flat surface in order to level. After polishing the inside surface with soapstone and then removing the excess polishing material, a flat piece of resisto asbestos board is laid upon the flat surface of this cast and held in close contact with suitable clamp or a piece of copper wire. (*Fig. 5*). After placing over a slow heat and being allowed to dry out thoroughly, the copper wire, if one is used, should be tightened again in order to compensate for the change that occurs in both the wire and material during the drying-out process.

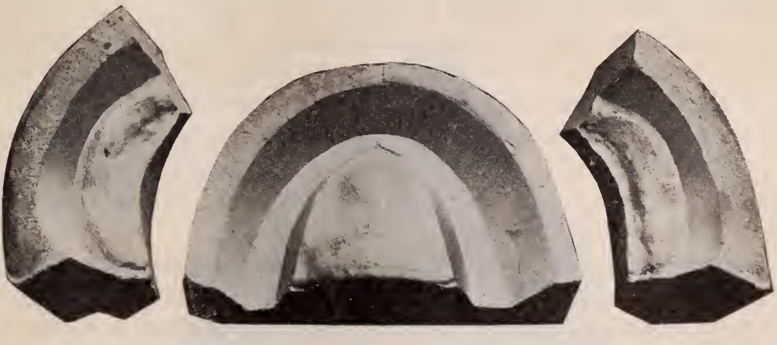

Fig. 4—Sections of plaster impression removed from cast.

The writer prefers to pour the metal die and swedge the platinum base after the method of Dr. O. H. Simpson, of Dodge City, Kansas, who stands the mold upon the anterior portion and pours into the posterior palatal opening. Haskell's Babbitt Metal is put into the ladle, care being taken to avoid pouring while too hot. When the metal assumes a mushy appearance, it is stirred with a soft pine stick while it becomes more fluid. If the pine stick chars the metal is too hot to pour and should be removed from the flame and allowed to stand until it begins to congeal slightly; then it is poured into the mold and tamped lightly with the square end of the stick used in stirring, and allowed to remain standing until crystallization has taken place. When the mold is opened, any excess along the joints of the mold is removed with a knife, and then with a stiff brush-wheel and pumice at the lathe, the die is polished.

In order to cut the platinum plate without unnecessary waste, No. 60 tinfoil is adapted to the metal die, trimmed to size as if this were to be the base, allowing perhaps a millimeter excess along the entire periphery and an additional eighth of an inch along the posterior border. This outline pattern is placed upon 32-gauge platinum, which is cut, placed upon the metal die, and with horn mallet and hardwood burnishers, adapted. In cases of deep vault it is often necessary to split the platinum in the region of the cuspids from the buccal border and extending over the crest of the ridge; this enables the operator to secure adaptation that will avoid tendency to buckle.

In the construction of the counter-die, modeling compound is employed. The metal die after being thoroughly oiled, is placed in the bowl of the putty swedger and a bulk of medium soft compound forced against it, the plunger placed upon the compound and then tapped lightly with a hammer to insure close adaptation. When the compound is thoroughly hardened, the die is forcibly removed by inserting a pointed instrument along the posterior border.

The platinum base is now put between the die and counter-die, placed in the swedger and struck one blow with a fifteen pound hammer. This is the only time that either die or counter-die is used. After removing from the swedger, any excess platinum is trimmed away; the case is then returned to the Spence cast and swedged upon it, a piece of rubber dam being used to keep the putty from forcing itself between the base and the cast.

For reinforcing the periphery, 18-gauge iridio-platinum wire is used as follows: The platinum base is imbedded in crown and bridge investment, leaving exposed near the heel and border a surface about three-eighths of an inch wide. Starting with a free end an eighth of an inch in length on the palatal side of the crest along one tuberosity, this wire is contoured and tacked just below the outer crest of the ridge; holding the wire with one hand and the blowpipe in the other, the wire may be contoured to follow the border with or without the use of pliers. (*Fig. 6*). It is fastened at intervals determined by the abruptness of the contour, and when contoured and tacked along the entire periphery in this manner, the base may be removed from the investment and the soldering completed. Rhotanium, (Rhotanium Co., Cuyahoga

Bldg., Cleveland, Ohio) a substitute for platinum, is used for this purpose. This metal may be used in building up contours and for filling in spaces where a regular platinum solder would not stand up *en masse* or bulk. Rhotanium meets these requirements and flows under the blowpipe more readily than a twenty-five per cent. platinum solder. It flows at a temperature 200 or 300 degrees below that required for pure platinum. The excess solder which might prevent the base from seating upon the Spence cast is removed, the base is returned to the cast and again swedged in the putty swedger.

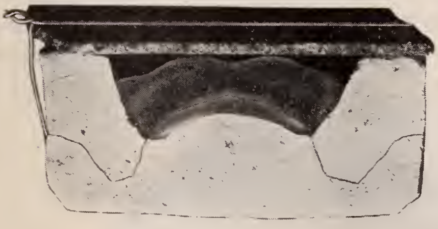

Fig. 5

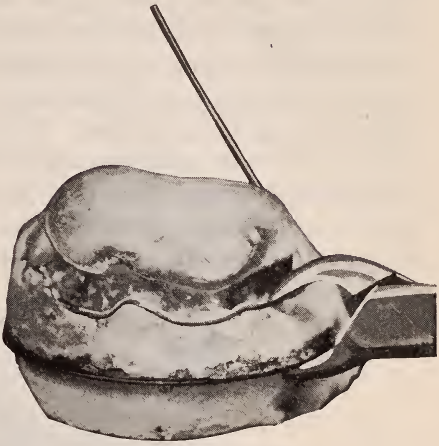

Fig. 6

Fig. 5—Duplicate impression with asbestos board forming a mold for Babbitt metal die.

Fig. 6—Contouring the iridio-platinum wire along the periphery under the heat of the blowpipe. Where a case has difficult angles a flat piece of metal is poured up with the base, as indicated in figure, to withstand the pressure exerted with forceps or pliers.

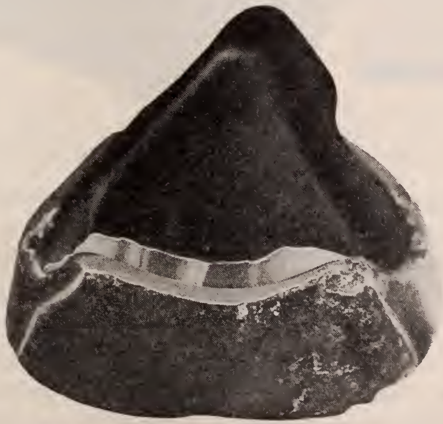

Fig. 7—A mass of compound assists the operator in turning the posterior portion of the platinum base to serve as a doubler.

After swedging this time, and before removing the base from the cast, the posterior border is strengthened. In the strengthening process, a line is drawn across the platinum to mark the desired length of the base, and along this line upon the palatal surface extending over the crests of the ridges, a surface of compound is built up at right angles to the base. This gives a clear-cut edge at right angles to and against which the base may be turned along the posterior border. (*Fig. 7*). While the operator holds the case firmly in place with one hand, the other is employed to insert a knife blade under the edge of the platinum and to force it up against this surface. If this is done with care, the platinum will not be split or broken. When the compound has been removed, a ball burnisher is used to burnish down the raised portion, thus giving a double thickness of platinum along the posterior palatal border. The base is now taken from the cast and the turned edge soldered with Rhotanium along its entire length. This doubler may be left as wide as the operator's judgment may approve, but the writer has found that a sixteenth of an inch is sufficient. The end of the wire which was contoured along the periphery is connected with the doubler in such a way as to form a continuous line with it. When this strengthener has been finished, the case is returned to the Spence cast and the wax-bite rim adapted. After taking the bite the teeth are arranged in the same manner as for any other case; with the teeth in position, the case is returned to the Spence cast, along the border of which—in the region of the second molar, the second bicuspid and between the lateral and cuspid on each side—notches are cut to assure correct and compact reassembling of the matrices which are now poured of plaster. These notches may be seen in *Fig. 8*.

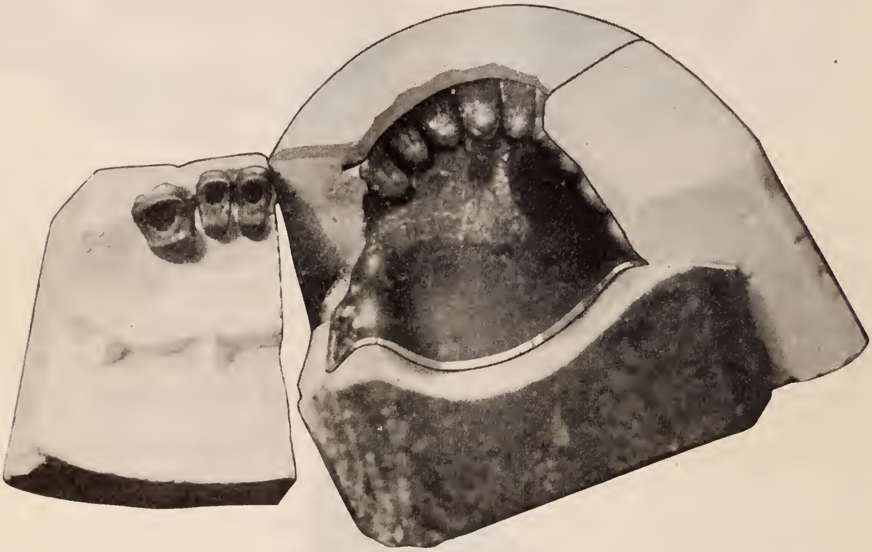

Fig. 8—One of the plaster sections removed, showing teeth in their matrices.

If the operator must order his pure platinum from a distance, he may send his tinfoil patterns with his order and, while waiting, construct upon the Spence cast his occlusion models. He then may take the bite or, if we use an expression which is now regarded as more in keeping with an accurate terminology, "establish 'central' occlusion," mount the casts upon the articulator, set up the teeth and prove them in the mouth. From this point the procedure is the same whether these temporary bases are used or the platinum bases are employed. In the case of the former, of course, a transfer to the platinum must be made at a later stage. We shall presently call attention to this.

In either case the base is sealed to the cast, care being taken to keep excess wax from the border of the cast, while any excess wax around the gingiva of the teeth also is removed. The matrices of plaster are poured over the occlusal and buccal surfaces of the teeth extending to the bottom of the cast; for purposes of convenience these are poured in three sections; the six anteriors in one section, with the posteriors forming the other two. When poured, these plaster sections are removed (*Fig. 8*), and the teeth thoroughly cleansed of wax by boiling in water; the wax is cleaned from the platinum base by burning off in the flame.

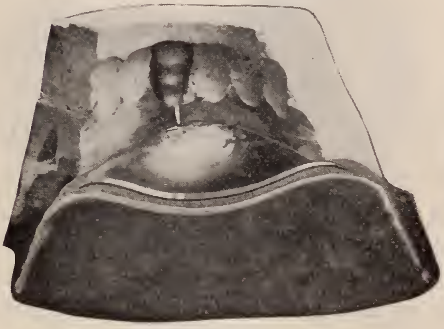

Fig. 9

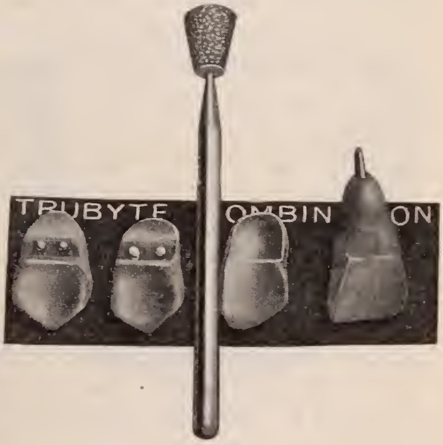

Fig. 10

Fig. 9—Tooth supplied with No. 16-gauge iridio-platinum wire.
Fig. 10—Successive steps and stone used in substituting iridio-platinum pin.

The base is returned to the Spence cast and the teeth put in their impressions in the sections. Each section is placed in position on the cast and the space between the base of each tooth and the platinum base is noted; where necessary, each tooth is ground sufficiently to permit the insertion in the diatorics of 16-gauge iridio-platinum wire long enough to be attached to the crest of the ridge, while leaving the tooth in its proper occlusion. (*Fig. 9*). In the case of alloyed pin teeth, the pins are cut off flush with the porcelain, and a No. 234 mounted carborundum stone is used to grind out the stumps in such a way as to leave a concave surface in the ridge-lap and shut portion of the tooth. (*Fig. 10*). The teeth are now put into hydrofluoric acid for a few seconds to remove the high glaze given them by the manufacturers, they are then placed in a saturated soda solution where they are washed thoroughly to neutralize the acid, and finally washed in clear water to remove the soda. With the glaze removed, the added porcelain will be more satisfactorily united with the body of the tooth during the fusing process. The buccal and linguo-occlusal portion of the posteriors, and the labial portion of the anteriors are polished with medium grit garnet discs, in order to remove the rough surface caused by the etching of the acid.

With the teeth re-assembled in the matrices and with wires of proper length in position and attached with a drop of wax to the base, Allen's Body Porcelain is packed around the wire and in the hole of each tooth, while the tooth is lengthened and built up around the iridio-platinum pin with porcelain until it extends almost to the base, leaving just enough of the pin exposed for soldering. With a chip blower the wax around each tooth is removed from its matrix, the excess porcelain removed from it, and the tooth then placed upon a fire-clay tray, put into the furnace and fused by any one of the various methods employed to bring the temperature up to 2100 degrees Fahrenheit.

Since it is now possible to obtain crowns in Trubyte moulds, the writer prefers in cases permitting the use of long teeth to use crowns, since they make possible a more natural lingual contour. Their use also makes unnecessary the preparation required when the operator must adapt teeth already supplied with pins and substitute in their stead the iridio-platinum wire. The mould numbers on the lingual surfaces are removed by grinding, and the holes for the pins are etched with hydrofluoric acid.

After the pins are baked into the teeth, these are re-assembled in their matrices upon the cast, and places marked for the location of 16-gauge iridio-platinum reinforcing wires. The writer feels that he can hardly over-emphasize the importance of supplying these wire trusses in sufficient numbers, since the strength of the finished denture lies almost wholly in the strength of this substructure. These wires should be placed as follows: One near each heel, one between the first and second molars, and one between the first and second bicuspids, all of these extending over the crest of the ridge and coming in contact with the buccal border of the base. A stronger result is secured if these wires are not permitted to lie in contact throughout their length; it is better to employ points of contact at the ends and upon the crest of the ridge, in which case they serve as suspension braces, as shown in *Fig. 11*. However, this is not possible in the case of the three or four palatal strengtheners which lie across the median line. These will be in contact with the base throughout their entire length. Further, these are flattened so that an unusual bulk of porcelain will not be required in order to conceal them. Finally, one is contoured to the border of the base following the contour and over the labial frenum, extending probably a half-inch on either side.

If the labial frenum is very pronounced, dipping down and attaching in the median line upon the crest of the ridge, it is easily seen that such an opening in the median line of the finished denture will tend to weaken it. Accordingly, the original Spence cast is trimmed here so that upon it the case appears to have a frenum attached high above the crest. When the denture is ready to place in the mouth, a local anesthetic is employed and the patient's frenum clipped back freely. The denture may then be inserted and worn while the tissue is healing. In the majority of cases no unusual discomfort is experienced by the patient. If the denture is not worn continuously during the healing period, the tissue soon will be restored in such manner as to defeat the purpose of the operation.

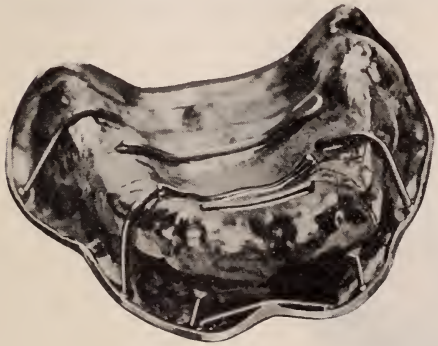
Fig. 11

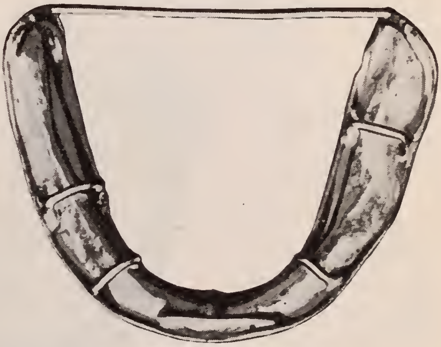
Fig. 12

Fig. 11—Platinum base with strengtheners and suspension braces.
Fig. 12—Iridio-platinum wire soldered from heel to heel to prevent warping.

The case is now re-assembled on the cast and the teeth stuck to the base, using base-plate wax for this purpose. The matrices are then removed and the base carrying the teeth is taken from the cast and invested for soldering. The base is filled with the investment and the teeth entirely covered, leaving exposed the palatal surface and the wax which holds the teeth. After the investment has set, the wax may be removed with boiling water, which will leave the pins and the plated portion of each tooth exposed. This exposed portion is covered with thin investment applied with a camel's-hair brush. When this has set, the investment around the junction of the pin with the platinum base is washed out. Squares of 32-gauge Rhotanium, about one-sixteenth of an inch square are forced between the iridio-platinum pins and the base. The whole case is put over the flame and heated to a cherry red when, with oxygen-hydrogen blowpipe, the pins are soldered to the base. No flux is required, since we are engaged with noble metals and employing a non-oxidizing as well as a non-carbonizing flame. The case is set aside until cool enough to be handled. In the case of the lower, before assembling the teeth preparatory to soldering, a length of 16-gauge iridio-platinum wire is soldered from heel to heel slightly below the crest. This is done as a precaution to prevent warping, and the wire is allowed to remain in position until the denture is finished. (*Figs. 12 and 13*).

In removing the investment after soldering, it will be found that some of the investment has been fused with the porcelain near the pins. With a sharp instrument, and with small mounted stones every trace of the investment is removed, since it is absolutely essential that all foreign material be removed from the teeth and the base in order to avoid gas bubbles which are likely to be caused through its presence. Wherever possible, small pieces of baked porcelain are gently inserted between the ridge-lap of each tooth and the platinum base, in order to prevent any subsequent movement of the teeth.

The case is now ready to receive the porcelain. (*Fig. 14*). "Allen's Continuous Gum Body Porcelain" is used in conjunction with "Close's Gum Enamel Porcelain;" and both of these are obtained from The S. S. White Co. The body porcelain is mixed with distilled water to a thick, creamy consistency and with a spatula applied to the base and around the teeth, while during the process the base is "fiddled" with the same instrument in order to pack it. The porcelain is built up to the full contour desired, no cognizance being taken of possible shrinkage. When built up, the porcelain is trimmed around the gingiva and the labial border of the teeth. With a piece of matrix band steel which is cut in triangular shape with sides about an inch in length, the body porcelain between the teeth is cut through to the platinum base. This is generally done by first cutting between the two centrals and extending this cut the entire length of the base; succeeding cuts then will form transversals uniting with it. The buccal and labial surfaces are cut similarly. In cases of extreme open bite in which instances there will be a considerable distance between the base and the teeth, it is advisable to

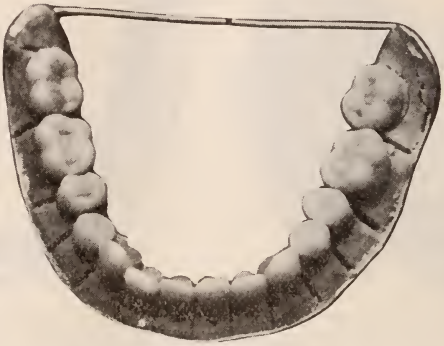

Fig. 13—Case showing shrinkage after the first bake.

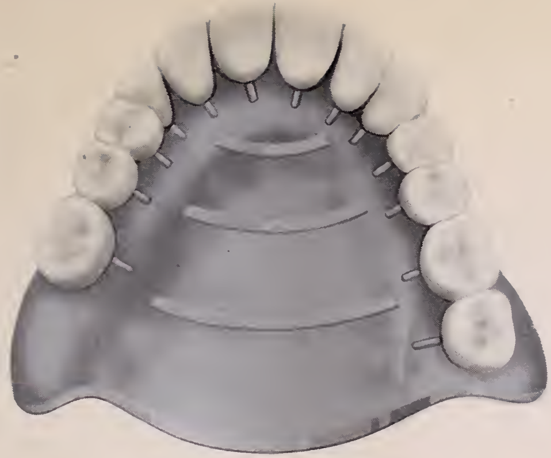

Fig. 14—Platinum base ready to receive the body porcelain.

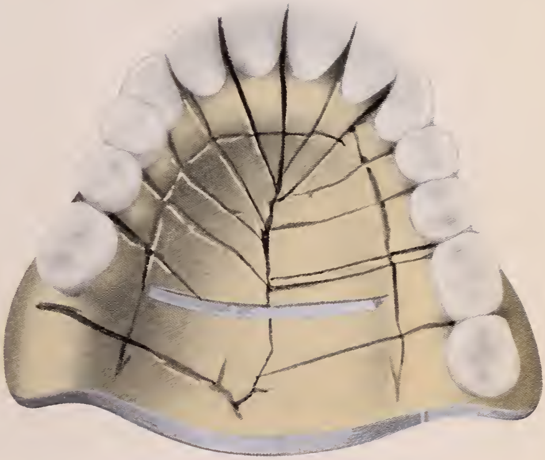

Fig. 15—Case showing shrinkage of body porcelain after the first bake.

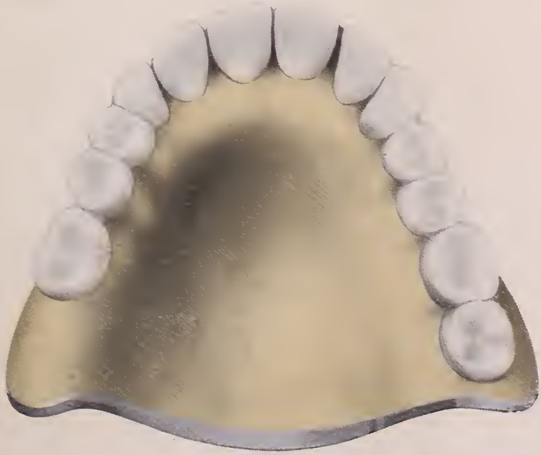

Fig. 16—Ready for the pink gum enamel.

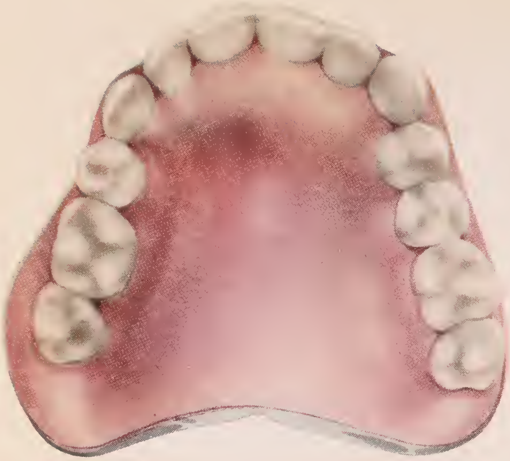

Fig. 17

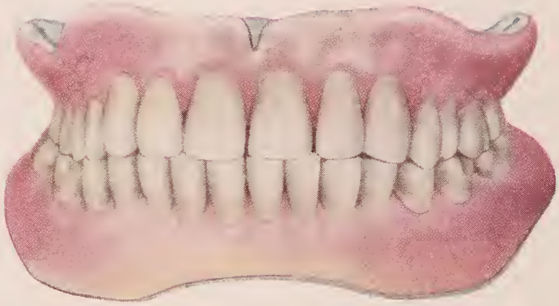

Fig. 19

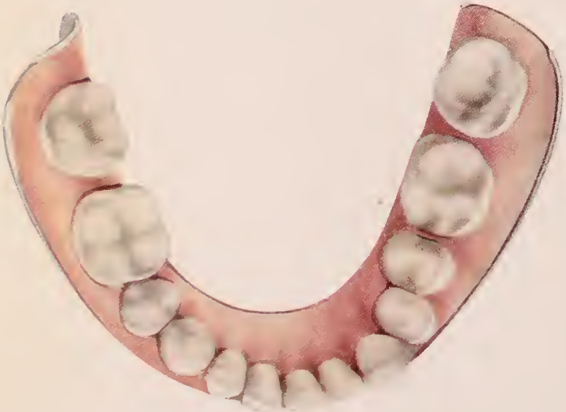

Fig. 18

These figures show two full upper and lower dentures after final baking.

make an additional cut about an eighth of an inch below the base of the teeth, and running parallel with the ridge. This method of cutting helps to determine the course of shrinkage around each individual tooth, and it is rare that the porcelain in shrinking along these lines will pull the teeth out of alignment. After cutting in the fashion described, the porcelain will be packed along the sides of the cuts, leaving little ridges which would result in tiny spines standing after the fusing process has taken place. In order to avoid this, spatula and brush are employed to pack these ridges down and brush them out until the cuts are practically obliterated. When this is done, the edges of the cuts fuse down and leave a concave depression and a smoother surface instead of sharp cuts.

The base is now placed upon a fire-clay slab, with both heels and the anterior portion of the periphery as well as the posterior border of the palate touching this tray. It is placed in the furnace and gradually brought up to 2100 degrees Fahrenheit; this constitutes the first bake and during it a fairly high glaze should be secured. When the first baking is done in this manner, the operator knows that he has obtained a good foundation which will not be changing during the successive processes. The writer uses a Pelton & Crane furnace and finds the suggested temperature sufficient, but each operator will find that he must determine the temperature required in the case of the particular furnace he may be using.

If the case is removed from the furnace immediately and placed under a cover glass, it will cool in much less time than will be required if allowed to remain in the furnace while cooling. (*Figs. 13 and 15*). When cooled enough to permit handling it is forced into place upon the cast, and if warped it may be necessary to break away the porcelain sufficiently to permit the close adaptation desired. When removed from the cast, the grooves are packed with porcelain and the contours built up wherever necessary; it is then replaced upon the slab and baked in the same manner as at first; when finished, it is cooled as before. Remaining cracks may be filled again with body porcelain and the pink gum porcelain applied before baking again, but the writer prefers to fill these minor checks and rebake as many times as necessary until the body porcelain presents a surface free from cracks. (*Fig. 16*).

When the base has been supplied with body porcelain as desired, the gum enamel porcelain is mixed with distilled water and a coating about a millimeter in thickness is applied, extending down below the gingiva of the teeth. This coat is scraped down thin at some points in order to give the desired shadings of color. A drop of water is now placed upon the pink porcelain at the gingiva of each tooth and, with a short flat camel's hair brush pressed against the tooth, the pink porcelain overlying the cervical margins may be pushed back in a roll, thus producing a contoured gingival border. The denture is now placed in the furnace and again baked at a temperature of approximately 2100 degrees Fahrenheit. Just before this point is reached, it is advisable to look into the furnace to see whether the case is properly glazed. It is properly fused when the surface of the porcelain presents an oily appearance. This time it should be allowed to remain in the furnace until cold in order to allow it to temper properly and consequently give it the desired strength.

In removing the thin layer of porcelain that may have overlapped the border, garnet discs are used, and the platinum is then given a high polish. *Figs. 17, 18, 19* show two full upper and lower dentures after final baking.

The denture is now placed in a pan of hot stearine and boiled until bubbles no longer arise. It is then removed and the stearine wiped from the surface. This boiling is necessary because of the fact that the porcelain is porous and because there is no absolute union between the platinum and porcelain; the stearine fills up the pores and spaces, and since its boiling point is sufficiently high, nothing that is taken into the mouth will melt it. The use of stearine renders the denture impervious to moisture thus making it highly sanitary; this is, so far as the writer is aware, a new method, and is probably the only new feature presented in this paper.

When a case is received to be repaired, it is placed in the furnace and *very* slowly raised to a temperature which melts out the stearine, drives off all moisture and burns out any products of fermentation that may have collected since the fracture. After the case has been burned out thoroughly, the repair of a continuous gum denture is a very simple operation if it is concerned with one or two teeth which have been broken off with a clean fracture. The broken pieces are placed in position with the aid of liquid silex. After the silex drys and the denture is put into the furnace it may be fused gradually at a temperature at least one hundred degrees below the original fusing point.

When a fracture of the porcelain itself occurs without disturbing the teeth, a different method is employed. A jeweler's small hammer is used to tap the line of fracture gently until it is enlarged sufficiently to permit the packing of new body porcelain. The same procedure in baking is followed as we have indicated in original construction.

Phases of technic presented in this paper which may appeal to you as novel or original have been developed by my associate, Dr. W. Clyde McClelland, who is responsible for the practical construction of my cases.

729 Shukert Building.

EXPLANATION OF THE BASIC PRINCIPLE OF THIS TECHNIC WITH A FEW THOUGHTS ON PROPER "SPRUEING*"

BY K. W. KNAPP, D.D.S., DES MOINES, IOWA

AFTER the wax pattern has been lifted free of the cavity it is carefully disengaged from the explorer point and dropped into the palm of the left hand. Sprue wire should vary depending upon the type of machine used in casting. For pressure machines such as the Taggart and Burns, the wire is of necessity of small gauge to prevent molten gold from dropping into the sprue passage way and congealing, thus blocking the cast. For centrifugal machines a larger sprue way is desirable as much sharper margins are produced, probably due to the fact that the gold is, in effect, poured into the mold and allows the air to get away. For this reason I have lately adopted the regular Monson sprue pin with decidedly better results. The sprue wire chosen is then held between thumb and finger of the right hand at one end, and the other end heated in the flame until it is just sufficiently hot to attach the wax pattern. Care should be exercised at this point not to overheat the wire, for to do so means that a comparatively large area of wax will receive the heat with a consequent tendency to warpage.

The position of the sprue wire is, I believe, an important consideration and I have adopted certain definite positions for the wire for given cases. In the first place, observation shows that there is a tendency of the gold in congealing to draw slightly toward the residue button. If the sprue wire be inserted near a margin, or in the center of a very narrow occlusal step, it will be found that the margins usually are drawn slightly toward the wire and thus show a slight discrepancy. Therefore, the first consideration in placing the wire is to choose an area where there is quite a bulk of wax and the margins are at a safe distance.

In the second place, the force used in casting should be taken into consideration, and that force made to work for us rather than against us. For instance, if a stiff-armed, horizontal throw, centrifugal machine be used, the forces exerted in making the cast are two, I believe. Let us take the case of a machine of the above type, such as the Monson casting machine in which the handle is turned to the right and the arm revolves to the left. The gold is melted in the crucible (a), (*Fig. 1*), to the proper condition for casting, and the handle turned to the right. The first force to be overcome is the inertia of the gold. If the handle be turned very quickly as is often done, practically with a jerk, the crucible, propelled by force and travelling to the left, moves faster than the molten gold (d), which wants to stand still, and as a consequence the flange (b), on the right side of the crucible strikes the gold and forces it to run along the flange toward the flask (c). This easily can be demonstrated by cutting down the flange or cutting a notch in it, in which case the gold will be spilled every time a casting is made, if sufficient force to make a good casting be used. The arm of the machine, still travelling faster than the gold, causes it to still exert a right-hand force, and the gold tries to find an exit at the point (e), where the flask and the centering ring of the machine join. This is again proven by the fact that, after casting, if the flask was not firmly seated at the point (e), it will be found that a small semi-circular piece of gold is left at this point. Or again, if a notch be cut in the ring at this point, the gold will run out through the notch. Now if the gold does have this tendency to go to the right at all times *up to the point of entering the sprue hole,* why is it not reasonable to expect that it also has the same tendency *after it enters the pattern chamber* (g)? And if it does have that tendency at that time why not place the sprue in the wax pattern, and the wax

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*The third of a series of articles on Casting Technic, written exclusively for THE DENTAL SUMMARY.

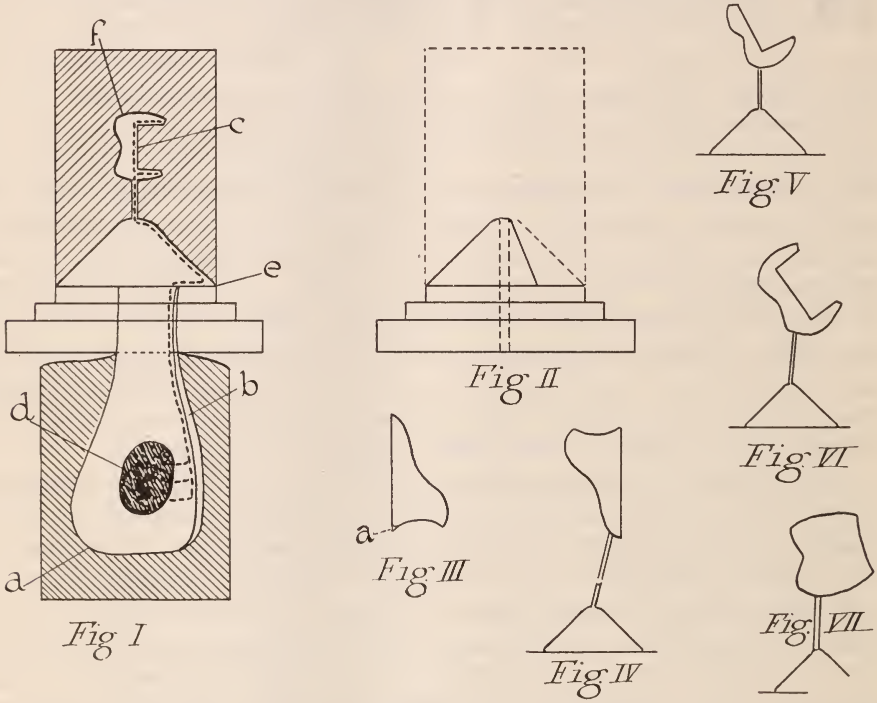

Fig. 1—Course taken by gold in entering pattern chamber when the machine is started too quickly shown by dotted line. (a), crucible; (b), raised flange on right side of crucible; (c), flask with M. O. D. pattern chamber; (d), molten gold; (e), junction of ring of mold with centering flange on machine; (f), pattern chamber.

Fig. 2—Showing sprue former cut away as described.

Fig. 3—Showing point at junction of labial and mesial or distal surfaces which is most likely to be rounded if any discrepancy exists.

Fig. 4—Showing placing of pattern and sprue in case of anterior three-quarter.

Fig. 5—Showing position of proximo-occlusal pattern.

Fig. 6—Showing position of M. O. D. pattern.

Fig. 7—Showing position of full-cast crown.

pattern in the ring, and the mold in the machine so that the gold will actually be cast *toward* the margins we especially want to be reproduced sharply, rather than *away* from them? For if we can cast toward those margins, utilizing this right-hand force, we can actually cause them to be cast *first* when the gold is most fluid rather than toward the last.

I fully realize that this is theory, but I have made many tests by using a sprue former which has had one side cut away (*Fig. 2*), in such a manner as to leave a shallow ridge and which makes a corresponding groove when the investment is poured. This gives a comparatively straight wall for the gold to follow and serves as a mark to show the position of the pattern.

Different types of wax patterns for technic cases were then mounted with the margin deliberately placed first to the right, and then to the left, and where any differences were noted at all, they were always in favor of the ones placed toward the right. It must be remembered that this only applies when the handle is turned quickly and with a jerk which is evidence that this quick starting throw is absolutely wrong in principle, and must be avoided if sharp castings are to be consistently obtained. According to Dr. Munson, the starting impulse should be modified to such a speed as will insure the gold leaving the lip of the crucible almost in a straight line toward the sprue hole. This reduced speed also allows much greater air escape and therefore these attenuated edges will not have rounded margins showing air lock. The actual casting probably is made in the fractional part of time during which the arm makes its first half turn, and the continued turning of the machine keeps the pressure on the gold until it has solidified. I use gold at a lower temperature than usually is done for reasons to be given later, and therefore it will solidify very quickly. It is for that reason that I want to make sure the gold gets to the most difficult margins in the shortest possible time and in the shortest way possible. This modified sprue former then allows one to know just where certain margins are in the mold, and it then becomes a question as to how to place those margins to get best results. For instance, in the case of a three-quarter crown for a cuspid, the most difficult margins to get sharp and clean cut are those at the junction of the labial and gingival extremities as in *Fig. 3*. In placing the sprue wire on one of the contact points I found invariably that this point (a), (*Fig. 3*), cast more sharply on the side in which the sprue was placed than on the opposite one. I also found that the gingival margin at the lingual cast sharply in almost any position, probably due to the fact that the reproduction of the cingulum gave a greater bulk at that point. At any rate I found that these ears were best reproduced by first adding a tiny drop of wax in the center of the incisal extremity of the lingual surface, and attaching the sprue in a direction as nearly parallel to the long axis of the tooth as possible, and also with the *labial* margins to the right. (*Fig. 4*).

In accordance with these experiments, I would suggest the following points of insertion and line of direction of sprue wires for centrifugal machines of the stiff-armed type:

For proximo-occlusal patterns as in *Fig. 5.*

For M. O. D. patterns as in *Fig. 6.*

For posterior three-quarter or full-cast crowns as in *Fig. 7.*

In using pressure or vacuum machines the most direct access to the difficult margins should be studied and the sprue wire placed accordingly. Inasmuch as the Monson casting machine is the one I am using, the succeeding description of technic will refer to that machine and such variations as may be necessary for other types of machines may be made on that basis. The hole in the center of the modified Monson Sprue Former is now filled with soft black carding wax, and the sprue wire which is grasped in a pair of notched pliers is forced into the wax until the pattern is in a position which will bring it in approximately the center of the ring; so that practically the same amount of investment material will surround it on all sides.

It is thought best at this point to state that the technic employed for the remaining steps, up to the point of casting, is based upon an entirely different principle from those usually employed. It is necessary therefore to explain that principle in order that the quite radical departure from the customary procedure be thoroughly understood before taking up the technic of investing, getting rid of wax and moisture, and casting. Many methods have been advocated for the getting rid of wax and moisture from the mold, but so far as I can see, they all may be reduced to two variations. The first, which we may call the volatilization method, is one in which the wax is first absorbed into the investment material by the application of low heat, and then the residue is carbonized and finally volatilized by great heat. In a series of pyrometer tests in which the wax pattern was invested, the top then cut open so the progress of the heating could be watched, and with the ends of the pyrometer wires insulated and applied to the sides of the flask, slow heat was first applied to absorb the wax into the pattern chamber walls and then greater heat applied, until the wax was first carbonized and then volatilized. In a series of ten tests I found that the pyrometer readings at the time when all traces of carbon completely disappeared, varied from 900 to 1000 degrees Fahrenheit on the outside of the flask ring. In two other tests the pyrometer wire ends were imbedded in the investment to approximately the same place where the wax pattern would be, and heat applied in the same way for the same period of time gave approximately 200 and 250 degrees Fahrenheit less than the outside readings.

Now, according to other investigators it is found that thinly-mixed plaster begins to contract and disintegrate (after the water of crystallization has been driven off by heat) at approximately 350 degrees

Fahrenheit. Thickly-mixed plaster under the same conditions does the same at approximately 400 degrees Fahrenheit. All investment compounds for inlays contain plaster in some proportion. Is it not then reasonable to believe that the plaster content of an investment material is practically ruined as regards its integrity when heated 600 to 650 degrees beyond its normal disintegration point? For it should be remembered that the wax does not carbonize until the mold is dry. This will lead us to believe, what in practice usually happens, namely, that when the molten gold is thrown against this weakened surface it gives under the pressure, and a warped casting is by no means the uncommon result. It is impossible to produce uniformly correct fitting inlays by this method and it should be discarded.

The second method, commonly called the carbonization method, is one whereby the wax is softened and melted into the investment by low heat as before, and then, by a controlled heat brought to the point of carbonization only. This method is a decided advance over the other, and many beautiful results are being obtained by using it carefully and watchfully. There are some objections to it, however, which I believe make it very difficult to produce uniformly-accurate results. In theory, the correct point of carbonization would seem to be that point reached by lower heating whereby the carbon residue from the wax just fills the little pores and interstices of the investment without occupying any space on the inner surface of the pattern chamber. This ideal condition, however, is not uniformly gotten, due largely to the fact that it is inconceivable to think that a large bulk of wax such as a pattern for a full-cast crown, and a very small one such as a gingival inlay pattern, will lay down the same carbon surface when heated at the same temperature for the same length of time. Moreover, in order to carbonize wax perfectly, as said before, it is necessary to have the mold dry and it is after plaster is dry that heat affects its integrity. Again, if the wax be undercarbonized there is a perceptible layer of carbon on the inner surface of the pattern chamber. This easily can be demonstrated by purposely undercarbonizing a piece of wax, carefully splitting the mold and examining with a high-power glass. Now two bodies cannot occupy the same space at the same time. Nor can gold and carbon, and therefore the resultant casting made into a mold which is undercarbonized will be *scant* by just as much as is the thickness of the carbon layer *plus* the contraction. In the case of the small pattern, if it be heated to the point which would be sufficient to properly carbonize the large pattern mentioned above, it probably would result in overcarbonization of the small pattern chamber with a greater chance for rough cast and possible warpage. In other words, it would seem that to obtain uniformly accurate results with the carbonization method, each pattern invested must be handled somewhat differently depending on its size. In view of the fact that either of the above methods outlined do not always give results, it would seem that some other method should be employed to make the result more certain.

The first two steps in the making of an inlay will always vary because of the personal equation. The laboratory steps should be as nearly as possible mechanical, and, given a correct wax pattern, that pattern should be reproduced to the same degree of perfection in every case. Now in any other process in dentistry when we wish to rid plaster (or plaster and silex combinations) of wax, we simply wash it away with boiling water. We have in an inlay mold the same two factors, wax and a plaster combination. Then why not employ the same principle to rid the plaster of the wax as in these other laboratory processes? If the wax is washed out of the mold by hot water leaving a clean pattern chamber, the dangers consequent to volatilization or carbonization are avoided. The wax can then be removed in its entirety at a temperature not to exceed 212 degrees Fahrenheit, the boiling point of water. The size of the wax pattern will then make no difference; large and small patterns will wash out alike, giving uniform results. It is then necessary only to dry the mold to a point where the free water is driven off and the water of crystallization allowed to remain in the pattern chamber walls, thus keeping them intact with their original integrity, for water of crystallization will not cause steam. Only free water does that.

Danger of warpage is avoided due to this retained strength. The gold will cast clear to the actual matrix wall; to the wall which fitted right up to the wax pattern. There will thus be no intervening carbon layer to cause discrepancy in case of error in carbonizing.

The surface of the casting will be the surface of the investment material itself, which can be predetermined by using the proper ingredients in that investment material to produce smooth or etched surface as wanted.

The pattern chamber can, by this moderate heat be slightly expanded, and, to a measure, compensate for the contraction of the gold.

And lastly, the time consumed in the laboratory process is reduced, occupying only twenty to thirty minutes from the time of investing the pattern to the point of casting. This last factor is, of course, absolutely negligible unless we obtain equal or better results than from methods which take longer. Given equal or better results, however, the saving of time *is* a decided factor, especially in certain cases.

This elimination of the wax by boiling water must be done in a very definite way, however, if correct results are to be obtained. Putting the flask in a pan of boiling water and continuing to boil it until no more wax appears to come from the sprue hole, has been advocated recently in a booklet issued by a manufacturer. The action produced by the water in this case is not a proper action to get complete elimination, and as a consequence, a film of wax is left on the inside of the pattern chamber. This film must be carbonized or volatilized just the same as if the wax were soaked into the investment by dry heat, and so nothing is gained by this method, and besides, using the material advocated for this method I found after boiling it out as described, that the surface of the investment was full of little holes produced probably by the action of the water boiling in this way, picking out little pieces of silex. I tried this method over a year ago and found it worthless, and want to take this opportunity of warning against this method for inlays. It may be allright for saddles where a slight discrepancy is immaterial, but for inlays it won't do.

We were warned by Dr. Taggart not to heat up the flasks too quickly for fear that the water would boil, and if it did, would check the investment and cause a rough inlay. He was right, of course, but it was because the material used at that time was not suited to the purpose. If the heat be properly applied and the right kind of investment material used, the water *can* be washed through the mold in the manner to be later described without checking or cracking the material and spoiling the fine lines and markings. It is necessary to use a material for investment which is decidedly different from the materials ordinarily used.

A study of materials and technic for investing will be given in the next article.

Utica Building.

FACTORS OF DESIGN AND CONSTRUCTION

BY A. ALFRED NELSON, D.D.S., DETROIT, MICH.

"THE best laid plans of mice or men, af't gang agley." And so in partial denture construction the same route is followed if the underlying osseous and soft tissue conditions and the health condition of the abutment teeth are unknown to us, for the reason that the underlying osseous and soft tissues must assume and sustain the stress of mastication to be placed upon the restoration. The above can be said to be the determining factors regulating design and mode of construction of a fixture. However, there are other considerations, though they may appear of minor importance, that need be taken into consideration and which, nevertheless, determine in the final analysis, to a greater or lesser degree the design and character of the work. These considerations are:

First, number of missing teeth and length of time they have been out—which determines the basic design.

Second, extent of resorption and necessity of restoring facial contour, which modifies basic design by adding or lessening bulk of fixture.

Third, occlusion of remaining teeth, which influences retaining devices as well as basic design.

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*The third of a series of articles on Partial Denture Construction being written exclusively for THE DENTAL SUMMARY.

Fourth, position of abutment teeth, which determines type of retaining attachment.

Fifth, type of attachment used, which modifies basic design by the influence of the connecting link between attachment and the denture.

The number of the missing teeth of course determines the scope of the structure though not necessarily the size or bulk. That is to say, the scope of work to be placed upon the denture is determined by the number of missing teeth. The position of the edentulous spaces in their relation to one another determines the basic design of the fixture and from this basic design we work up our finished product, bearing in mind at all times the primary function of the fixture, *i. e.,* to restore masticatory efficiency.

The length of time the teeth have been out is of importance in calculating the amount of possible rebuilding that will have to be done during the period of resorption. This applies particularly to recent extractions and also to those cases of pyorrhea and badly-infected teeth that have been extracted. This area due to its toxic condition is very deceptive in that the initial resorption extends over a longer period of time than is usually the case. This factor does not alter the basic design, but it is of material advantage to recognize this condition and be able to explain it to the patient. The extent of resorption and the necessity of restoring facial contour is a factor that modifies the basic design in that it determines the weight or bulk of the structure and what must be planned for. This means the substituting of lighter materials which will have the required strength.

The occlusion of the remaining teeth and their position in the line of occlusion (in the same jaw as the fixture) has no radical bearing on the basic design but does influence the retaining devices to be used. The occlusion of opposing teeth has a bearing on the basic design in that the forces of occlusion should be at right angles to the major surface carrying the fixture and thus aid in retention.

The position of the abutment teeth determines the type of attachment or retaining device that is applicable to the case in that it determines the form of retention that is to be used. Whether it be bilateral-diagonal, bilateral-horizontal, triangular or double-bilateral-diagonal form of retention.

The type of attachment to be used influences the basic design in that the connecting link between the denture and abutment tooth varies in different attachments, some requiring more space and freedom of motion to function as stress breakers than others and provision must, be made for this feature as well as the mode of application.

These five factors are of utmost importance and their application in the study and planning of a case will be taken up in another article.

213 Chalmers Bldg., Parsons at Woodward avenue.

CASTING SADDLES AND CONNECTING BARS TO ABUTMENT PIECES ON ORIGINAL MODELS*

BY J. A. GARDNER, D.D.S., MEMPHIS, TENNESSEE

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WHILE the dental profession has made great progress in the theory and practice of casting, I feel, as many others do, that we have only made the beginning in this great field. However, we can only hope to advance by degrees. Therefore, if I should be fortunate enough to give someone a new idea, or straighten someone out in an old idea by writing this article, I shall feel more than repaid for the time and effort expended.

I wish to call attention, first, to the great difficulty, if not impossibility, of securing satisfactory adaptation of a saddle to the ridge by the swaging or indirect casting and swaging methods.

In most, if not all cases, in the ridge over which the saddle is to rest, we find undercuts, depressions, and eminences, and to secure comfort it is necessary to secure proper adaptation or an exact reproduction of a perfectly-adapted wax form, which I never have been able to do by swaging or by casting in a mold from a wax pattern obtained by molding the wax over the model and removing it from the model, investing, and casting. Neither have I had satistacfory results by the casting and swaging method. Therefore, I have come to the conclusion that it is impossible to secure as satisfactory results by swaging or indirect casting and swaging, as can be gotten by casting to the original model, wherever possible; and so far, I have not been able to find a material as satisfactory for a model in this work as Spence's plaster properly handled.

Second, I will call attention to the difficulty, if not impossibility, of securing proper relation of the saddle to the abutment pieces and lingual or palatine bar by the usual method of assemblage. I never have been able to get satisfactory results by any methods so far proposed, where the saddle or saddles, abutment pieces and connecting bars are made separate, and then assembled by soldering them together.

With the idea in view of securing an accurate adaptation of the saddle to the ridge, accurate relation between the saddles and abutment pieces and lingual or palatine bars, I have adopted the following method and definite technic in the construction of bilateral cases in the upper and lower mouth, which has proven most satisfactory in my hands for the past three years. While I prefer using some form of a connection similar to the grasshopper attachment between the abutment piece and saddles in large cases, as a compensating device for the compression of tissue under mastication, however, any attachment piece can be employed, and at the same time, carry out the technic which the writer advocates in this article, and secure the same results in so far as accurate adaptation of the saddle to the tissues, and the proper relation of the saddle, or saddles to the abutment piece, or pieces and connecting bars.

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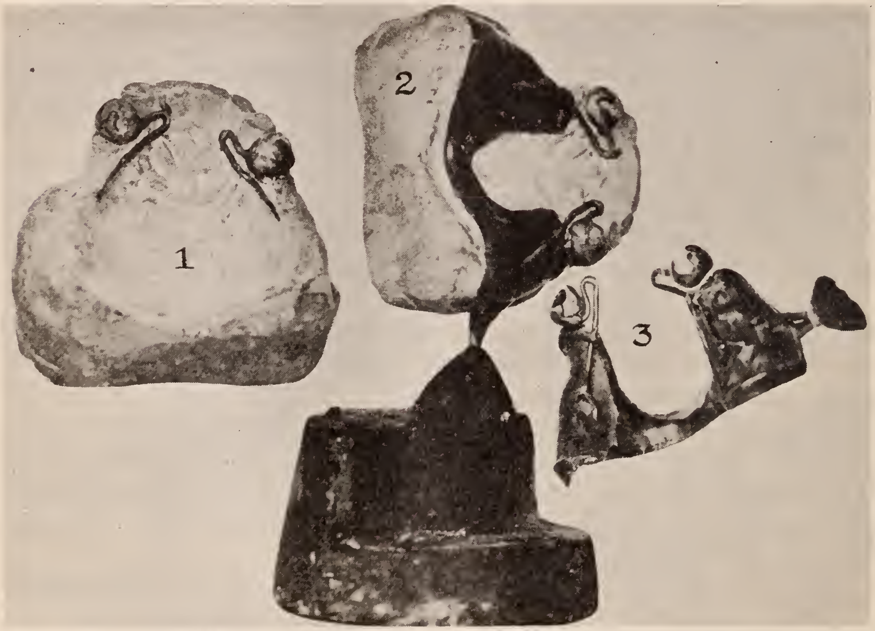
*One of a series of articles written for DENTAL SUMMARY readers by Dental College Teachers.

I will first discuss the technic for the construction of an upper case replacing the lost first, second, and third molar on both sides. The impressions of the abutment teeth are secured, (using, of course, a split tray). The impression is properly treated with liquid silex, and allowed to dry for fifteen minutes. The impression is then dipped in cold water, the excess removed, a stiff mix of Spence's plaster is prepared and the impression filled by employing a very small piece of the Spence plaster at a time, and thoroughly vibrating until impression is filled. Allow the Spence plaster to set for three hours, separate, and wax up for clasp on the Spence tooth, (being sure to seal the wax form for clasp around its entire margin), invest, and cast. After the clasps have been thoroughly cleaned they are placed in the mouth, and an impression of the lingual surfaces of the anterior teeth and soft tissues as far back as the saddle end of wires are to extend, is now taken. I prefer using modelling compound for this impression. Clasps are removed and placed in their respective positions in impression. The impression



is filled with crown and bridge investment and a piece of Neyoro wire, 15-gauge, is secured and adapted to the case in the form of a cotter-pin, and at every point the wire is bent, 20K gold plate should be fused over it to take care of a possible crystallization as shown in *Fig. 1.* The saddle end of wires should be flattened and two or more holes drilled through the flattened portion, so as to insure a mechanical attachment in the casting, if not a molecular attachment. The clasp end of wire is soldered to the clasps, and the two abutment pieces with wire attachments are placed in the mouth and so adjusted that they may be readily removed from the teeth. The impression is now taken with plaster. It is desirable for the abutment pieces to remove with the impression. The impression is properly treated with liquid silex as a separating medium and filled with Spence's plaster, carrying out the technic as above described, allowing it to set three hours before separating. Extreme care should be used in separating so as not to interfere in any way with the relation of the wires or clasps. With abutment pieces complete and in proper relation on the original Spence model, as shown in *Fig. 1*, we are now ready to proceed with the waxing up of the saddle and palatine bar.

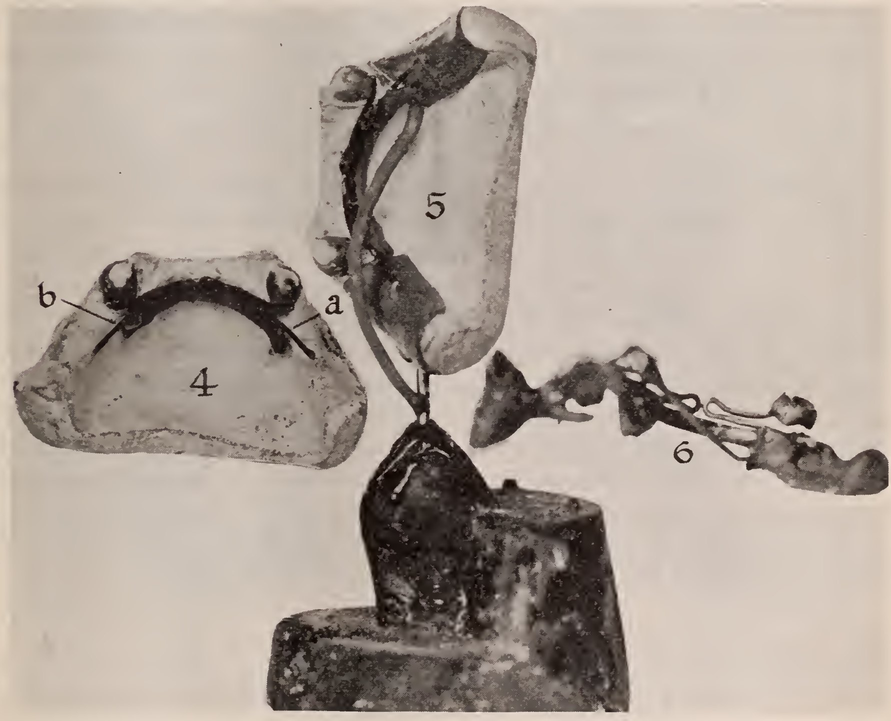
A sheet of 28-gauge disappearing wax is selected and weighed. The wax is then placed in warm water, or gradually softened over a flame until pliable. One end of the sheet of wax is slipped under the end of the wires until it is in contact with the distal surface of the clasps, and with the thumb and index finger it is gradually adapted to the entire surface of the model. When thoroughly adapted, a sharp knife is used to cut out the wax to the form desired for saddle and palatine bar, as shown in *Fig. 2.* The wax form is now sealed around the entire periphery to the Spence model, and the portion of wax form for palatine bar is built up to the desired thickness for proper strength in the finished case.

Proper loops and finishing margins are prepared in the wax form for the reception of the vulcanite. A small strip of wax is placed over the end of the wire and fused into the holes, and at the same time, attached to the saddle portion of wax form as shown in *Fig. 2.* It also is well to have an additional loop of wax running over the wire at the anterior margin of the saddle. The case is now ready for mounting, preparatory to investing and casting, as shown in *Fig. 2.* In these very large cases, I consider it safer to first invest the model waxed up ready for casting, in properly-mixed Spence plaster, leaving the end of sprue wire exposed, and then mount on former and invest in ring with any kind of inlay investment. I find that Spence's plaster undergoes less change, under heat, than any other material I have found so far, and, if properly manipulated, will give a very smooth surface.

You will observe by referring to *Fig. 2* that I have only used one bifurcated sprue, and I have selected the buccal margin of one side for the location of the sprue wire. A hole is drilled into the model at this point deep enough to insure a firm attachment to one prong of the sprue wire. I believe there is a great deal more importance in the position and number of sprues than some of us have realized. Personally, I do not favor multiple sprues. In fact, I am satisfied that one sprue is sufficient for the largest casting used in dentistry. Where we have more than one sprue there is great danger of air currents being caught between the flows of molten metal in different directions, and preventing a union of the gold coming from different sprues, which accounts for holes in large castings, especially where an effort is being made to cast a thin gold base for a full denture. The reason I have a bifurcated sprue in the case shown in *Fig. 2*, is due to the fact that one prong of the sprue wire is merely for the purpose of holding in rigid position the model on the former while it is being invested. Otherwise it would not be necessary to have the sprue bifurcated. The sprue should be placed at a point where the least amount of lateral flow of the metal would be necessary, and always incline the sprue in such a direction as not to have the portal of entry at right angles to the surface of the model over which the gold must flow. In other words, all surfaces over which the metal is to flow should be distal to the portal of entry. Many failures in casting large cases have been due to an insufficient amount of material, which is inexcusable. As near as I have been able to determine by weighing many different makes of waxes, and many different makes of casting gold, I find that one grain of wax is approximately equal to one pennyweight of gold. Therefore, if you have weighed the sheet of wax selected for the case, and you have been careful to save all of the scraps left after waxing up the case, it becomes a simple matter to weigh the scraps, and subtract that from the total weight of the original sheet of wax, and you will have the amount of wax actually used in the wax form, which will give you the exact amount of gold you should use in that particular case. In other words, for every grain of wax used in the wax form, you should use one pennyweight of gold. For example, if you have used fifteen grains of wax in waxing up your case, you should use fifteen pennyweights of gold, plus five pennyweights for excess. *Fig. 3* shows the case after casting, which weighs twenty-one pennyweights, including the excess nugget and sprue. After the excess nugget and sprue were removed and the case polished, the weight was approximately fifteen pennyweights and sixteen grains.

While the technic for constructing the lower case is very similar to that of the upper, yet there are several steps which differ from that of the upper. The clasps are completed as above described and placed in position on the abutment teeth, an impression is then taken of the lingual surfaces of the teeth, clasps, and ridges as far back as the saddle ends of wires are to extend. Modelling compound is used for this impression. Clasps are removed and placed in their respective positions in impression, and attached to the impression with hard wax. The impression is filled with crown and bridge investment and allowed to crystallize. On this model the wire attachment is adapted as described in the upper case, and the clasp ends of wires attached to the clasp with hard wax.

A wax form is now made for the lingual bar by adapting a strip of Tenax wax in the proper position beneath the wire or cotter-pin attachments as shown in *Fig. 4.* The wax form is built up to the desired thickness with Kerr's blue wax, removed, invested and cast. After the casting has been given an acid bath it is adapted on the model, allowing one to two millimeters clearance from the soft tissue to prevent irritation in the process of mastication, the lingual bar is attached with hard wax to the model and to the saddle ends of the wire or cotter-pin attachment as shown at points A and B, *Fig. 4.*



The case is now invested and the clasp ends of wire are soldered to the clasps, and the saddle ends of the wires are soldered to the ends of the lingual bar at points A and B, using 22K solder. After the case is removed from investment it should be given an acid bath, the saddle ends of the wire attachments flattened, and a hole drilled through the flattened portion. A hole also should be drilled through the end of the lingual bar to insure a mechanical attachment in the cast.

The case is now carried to the mouth and adjusted so that the clasps will readily release from the teeth, as it is preferable for the appliance to remove with the impression. Before taking the impression, the teeth anterior to the abutments should be dried with warm air, and covered with base-plate or beeswax and chilled with ice water. This will allow the impression to come out without great difficulty. The best quality of impression plaster, in ordinary impression tray is used for this impression. The writer is getting very excellent results with the "Clover Leaf Double X Impression Plaster." The impression is treated as outlined for the upper case and filled with Spence's plaster, using the same technic as described for the upper case. The case is now ready for waxing-up, mounting, and investing. The writer uses 28-gauge Tenax wax for the saddles, and Kerr's blue wax for sealing margins of the wax form for the saddles, to the model. I prefer to use a narrow strip of Tenax wax, 28-gauge for the finishing margin and loops for the reception of the vulcanite. Care should be taken to make sure that the end of the wire attachment has been completely covered with wax and attached to the wax form for saddle. The end of the lingual bar also should receive special attention, making sure that the hole in the bar is filled with wax, and the end of the bar is covered with wax and attached to the wax form for saddle as shown in *Fig. 5*.

You will note that the buccal margin of the wax form on one side is selected for the position of the sprue wire, which is to support the model on the former, and furnish a sprue through which the metal for one saddle is to flow as shown in *Fig. 5*. The sprue for the other saddle is made by employing a narrow strip of Tenax wax, which is attached at one end to the antero-lingual margin of the distal saddle, and the other end is attached to the main sprue wire as shown in *Fig. 5*. The wax strip for sprue form should not be allowed to touch the clasps, lingual bar, or any part of the wax form, except at the end where it is attached to the antero-lingual margin of the distal saddle and the main sprue wire. *Fig. 6* shows the lower case after casting.

718 Union Ave.

> I AM NOT BOUND TO WIN, BUT I AM BOUND TO BE TRUE. I AM NOT BOUND TO SUCCEED, BUT I AM BOUND TO LIVE UP TO WHAT LIGHT I HAVE I MUST STAND WITH ANYBODY THAT STANDS RIGHT, STAND WITH HIM WHILE HE IS RIGHT AND PART WITH HIM WHEN HE GOES WRONG.
>
> —*ABRAHAM LINCOLN*

PULPOTOMY AND PARTIAL PULP-CANAL FILLING*

BY W. CLYDE DAVIS, B.SC., M.D., D.D.S., THE UNIVERSITY OF NEBRASKA,
LINCOLN, NEBRASKA

IT HAS BEEN BELIEVED AND TAUGHT by many that the recuperative power of the pulp was practically nil; that the pulp once robbed of its normal covering was doomed to death. The methods of practice by our most advanced men have been based upon that supposition. Pulp devitalization and extirpation, which is pulpectomy, has therefore been the general and almost universal practice in all cases of pulp exposure.

With the advent of better methods of anesthesia, destruction of the pulp with arsenic has been replaced with pulpectomy under local anesthesia. Pulpectomy, or complete pulp removal, was attempted for many years but seldom accomplished, as ninety-five per cent. of all tooth roots in middle life have more than one foramen. Attempts at pulpectomy must now be abandoned as it has proven an impossible operation.

It is with a certain degree of temerity that one should appear before you advocating so radical a method as that of "pulpotomy" (being the correct term for pulp amputation), to be followed by a partial root filling in all cases wherein the exposed vital pulp is encountered. However, the work during the past three years has brought to light much conclusive evidence of complete repair on the part of the pulp following surgical injury.

You have all viewed many roentgenograms. It has been the experience of each to occasionally see a tooth with a partial root filling wherein the periapical tissues appeared the same as those about the neighboring vital teeth.

A microscopical examination of these root ends and the pulp canals, from the root filling to the apex, reveals a difference in the conditions in these cases and the conditions found where granular areas existed.

Going back in literature, the first mention we have found of changes of an osteoid nature in a pulp canal is in the early writings of Cadman, in 1851, and Chase, in 1868.

Many years after this, Mr. Caush, of Brighton, England, read a paper before the World's Columbian Dental Congress, presenting a few slides from his collecton showing complete closure of pulp canals for nearly their entire length. In all the cases he showed, there had been violent inflammatory conditions external to the root. He associated these changes with a disease condition external to the root and

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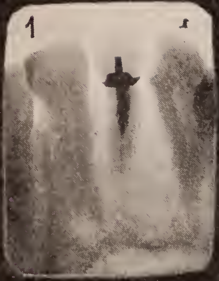
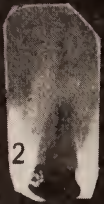
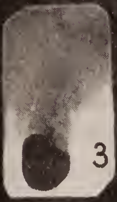
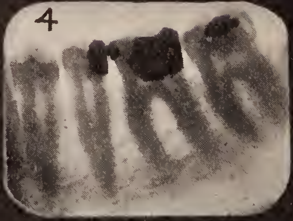
*Read before the Chicago Dental College, Jan. 29th, 1921.









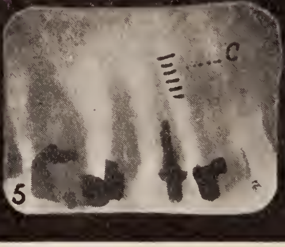


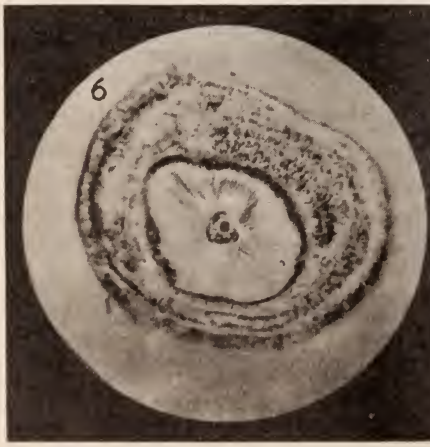
Fig. 1—Case 170. Canal filled just short of the apex ten years previous.

Fig. 2—Case 128. Pulpotomy and short root filling seven years previous. Sections in this case show small portion of pulp persistent.

Fig. 3—Case 130. Same history as Case 128.

Fig. 4—Case 155. A so-called "mummifying paste" was used in this tooth some years previous to extraction, after which it was immediately prepared and sectioned. All canals were completely closed from mid-root to the apex.

Fig. 5—Case 141. First right superior bicuspid. Root filled many years ago. Patient said, "at least ten years." Prescribed pressure anesthesia and immediate setting of the crown at one sitting. Tooth had never troubled or been sore. The only attempted root filling was in the way of crown and bridge cement, for two millimeters beyond the post. The periapical space had been obliterated. It was found that the pulp was still vital in the central portion. There is much evidence that it was active in the process of building in bony structure at the time of extraction.



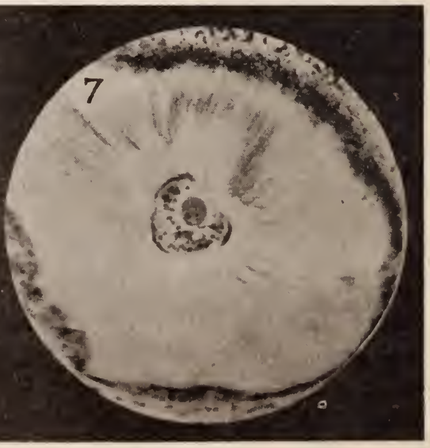


Fig. 6—Case 141. Section C. Magnification 20x.
Fig. 7—Case 141. Section C. Magnification 50x.

with hyperplasia of cementum. In no case had there been any pulp-canal surgery attempted.

Dr. Arthur Hopwell-Smith, in his book entitled, "Histology and Patho-Histology of the Teeth" published ten years after the findings of Caush, reprints some of the slides from Mr. Caush's collection. He also adds some from his own laboratory. This writer treats the subject from the standpoint that the pulp makes these repairs within the canal following trauma.

Dr. Carl J. Groves, in the *National Dental Journal*, Vol. 6, No. 8, page 169, shows a case wherein the lumen of the foramen has been materially lessened following the filling of a pulp canal just short of the apex. The articles mentioned, together with that of Salter in 1874, are practically all of the writings to date which are akin to the subject in hand.

In the articles mentioned, there is ample proof that the pulp is very willing to undergo repair in the absence of infection. It is not at all unreasonable to find that it does build in new tissue for protection. However, the process by which it makes these repairs, and the new tissue which it builds, is quite interesting. You all know that the external layer of cells which covers the entire pulp under normal conditions, is made up of odontoblasts. In their place there seems to come into existence a complete layer of mononuclear giant connective tissue cells with every appearance of being osteoblasts. Chase in 1868 and Salter in 1874 so stated.

Taking this pulp repair step by step, it seems to follow nearly the same process which takes place in the medulla, in the remaining portion of an amputated long bone or in case of injury to the medullary tissue due to fracture.

The cementum is not bone, but bone-like. The methods of its repair are not just like those of the repair of bone, but are as similar as are the structures and environment.

The tooth's pulp is not medullary tissue, but is like the medulla in some respects as to environment and functions. Just one point of similarity in the way of illustration. In the "Principles of Pathology", by J. D. Admi, Vol. 1, page 560, relative to the regeneration of the medulla, the Doctor says: "Beyond the proliferation of the vessels, it is deserving of note that in these cases of injury (meaning surgical or traumatic) of the marrow, there is little evidence of reactive inflammation; there is for example no migration of polynuclear leukocytes in the injured area."

The similarity in this connection of repair of the pulp following pulpotomy is seen in the fact that there is practically no clinical manifestation of either active or passive hyperemia of the pulp. The tooth does not respond to thermal changes, does not ache and is not sensitive

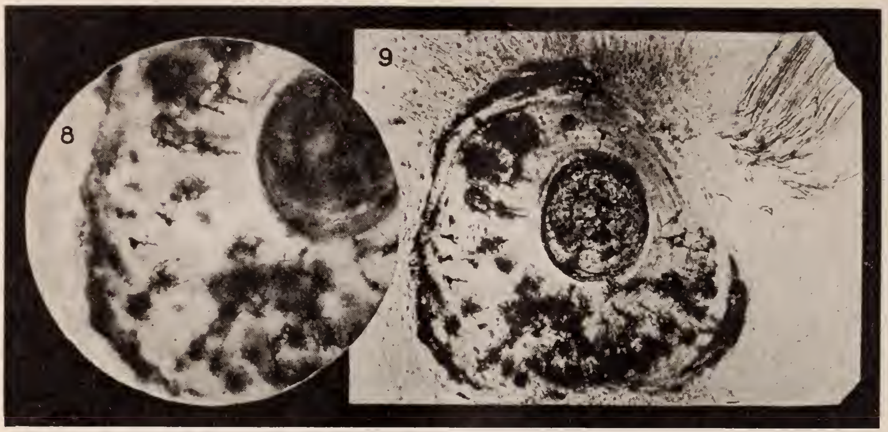


Fig. 8—Case 141. Section C. Magnification 430x.
Fig. 9—Case 141. Section C. Magnification 320x. (Projection).

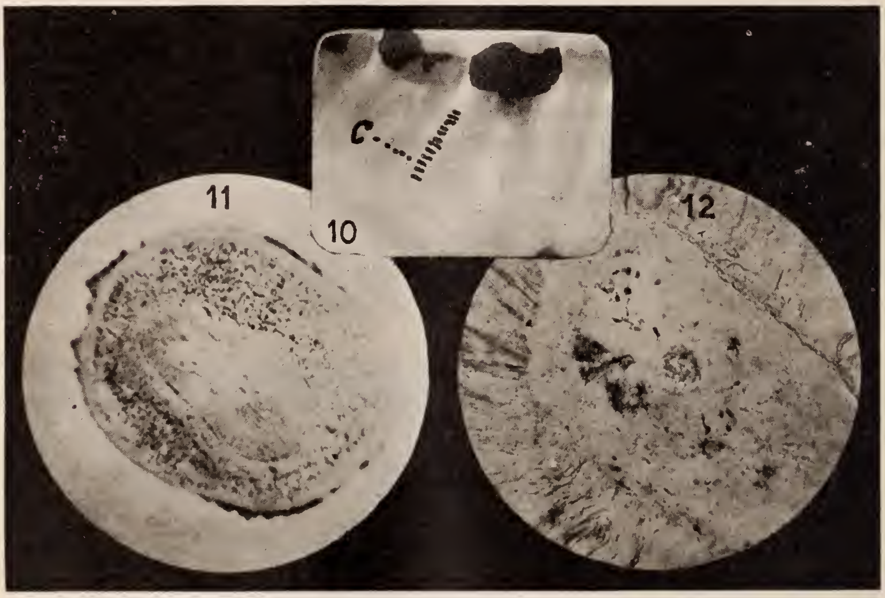


Fig. 10—Case 157. Roentgenogram taken sixteen years after treatment and filling. Case appeared to the dentist according to his records as semi-putrescent. He found the mesial canals putrescent. He attempted sterilization, and filled the mesial canals with a so-called "pulp preserver." It will be seen that they progress to form an abscess which was the final cause for extraction. In the distal canal the dentist found a vital and bleeding pulp at the floor of the pulp chamber. The dentist states that he placed this preserving paste, so-called, over the vital stump and filled the tooth. This case is given as one of the extremes to show what has happened even in a vital and an infected pulp.
Fig. 11—Case 157. Section C. Magnification 20x.
Fig. 12—Case 157. Section C. Magnification 50x.

to percussion; in fact, the patient has no clinical symptoms of any pulp disturbance.

Following pulpotomy at any point below the bulbous portion, there is exuded from the contents of the vessels of the pulp, tooth pulp callus, much after the same plan as callus is thrown out by the medulla, known as medullary callus. This material remains unorganized. Next below this is built in a structureless calcified tissue having few fibrilla, lacunæ, or canaliculi.

The next section below this shows structure wherein we see well-formed lacunæ and canaliculi. At this time there appears the product of ostoblasts around the entire periphery of the pulp from near the wound to the apex. There is then built in, in extrinsic layers, a structure which has every appearance of bone minus the Haversian canals. This progresses, more or less rapidly, till the lumen of the canal is very materially lessened or completely closed.

The pulp retracts leaving a small point of unorganized calcic matter at the most crownwise portion. This construction is completed much after the manner in which the pulp decreases in size with age, leaving what is known as "the retractive tract of the pulp." Also, in the same manner as the medulla closes the end of a bone following amputation.

Associated with these pulp canal changes, there is a material lessening of the size of the periapical space. In fact, in most instances, it is obliterated so that there is no more space about the apex for the habitat of the peridental membrane than there is normally along the sides of the root.

From the work thus far it would seem:

First, following pulpotomy the process of repair on the part of the pulp seems to harmonize with the process of repair in the medullary canal.

Second, this process does not seem to take place in any case unless the bulbous portion of the pulp has been removed.

Third, it seems to take place provided the point of excision down the pulp canal is not beyond the end of the dentin.

Fourth, the odontoblasts in the remaining portion of the pulp following pulpotomy seem to disappear as no instances have been found wherein any tissue resembling dentin has been built. Tomes, in his text, "A Manual of Dental Anatomy," states that the odontoblasts become atrophied.

Fifth, all of the new tissue which is built seems to be the product of ostoblasts. Dr. Henry S. Chase, in the *Cosmos,* Vol. 10, page 17, in 1868, contends that it is built by newly-formed osteoblasts.

Sixth, ten per cent. of the cases show complete closure of the canal. The remaining ninety per cent. show vital connective tissue persistent in the central portion of the pulp canal even sixteen years after the operation.

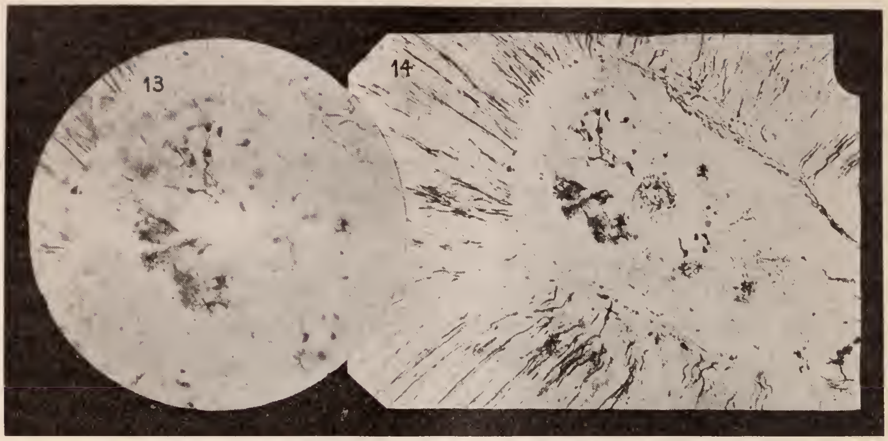


Fig. 13—Case 157. Section C. Magnification 430x.
Fig. 14—Case 157. Section C. Magnification 320x. (Projection).

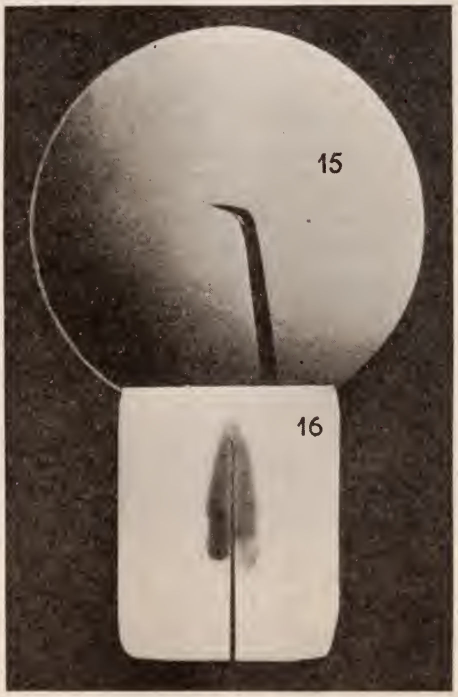


Fig. 15—Pulptone made from a Donaldson Hook Broach. These should be made in three sizes, of which the above is the medium. Magnification 20x.

Fig. 16—Pulptone in position to amputate a vital pulp. This would be in position for a case of deep pulpotomy. (Natural size).

Seventh, in no case where pulpectomy had been attempted, and the canal filling has reached the foramen, has there been any attempt on the part of the tissue to close over the opening. However, in a large per cent. of these cases, two, three, four and even five or six lateral canals have been closed with this new tissue.

Eighth, in no case has there been an attempt to close the canal where arsenic had been used to complete devitalization, or the subsequent treatment had included the use of destructive drugs.

Ninth, all cases give a history of surgical pulpotomy while the pulp, the part, or the patient, was anesthetized and a partial root filling placed to this point of amputation. These root fillings have been both intentional and unintentional.

Tenth, at this time it would seem that the larger the pulp at the dento-cemental junction, the more active and complete the process.

Eleventh, the younger the patient the more readily does this seem to take place.

Twelfth, the most complete closures have been made in cases not associated with hypoplasia of cementum; in fact, hypoplasia of cementum seems to indicate an infected case.

Thirteenth, the dressings or canal fillings which are placed on the remaining portion of the pulp following pulpotomy seem to be of little importance so long as the dressing or filling is non-irritant, or perhaps very mildly antiseptic, and would not injure a case if applied as a dressing to the end of an amputated bone.

It would seem that this repair is in harmony with the first steps in the repair of bone injury on the part of the medulla.

The osteoid tissue is built in the same manner but is not changed to true bone, this last step being omitted, probably due to a lack of circulation.

It would seem that at least some of the pulp tissue must be left in the apical region, surgically traumatized, supported by a functioning peridental membrane to inaugurate this construction. There is the deposit of callus, the atrophy of the odontoblasts, the formation of spindle-shaped cells, the development or transmigration of osteoblasts, the construction of hyoline tissue, and calcification into an osteoid tissue, which is not transformed into true bone.

To the pathologist this is pathological tissue.

To the histologist this is degenerated tissue.

To the physiologist this is repair tissue.

A few slides of extreme cases:

PULPOTOMY TECHNIC

Some several hundred experimental cases in the University of Nebraska are now being watched with interest. Some of these were done two and one-half years ago. These were done under the following instructions:

First, have at hand a roentgenograph of the tooth to be operated on. Employ all possible means of avoiding infection. Think of hands, instruments, mouth contamination, infected cavity, etc.

Second, avoid all drugs and chemicals that would injure the most delicate of tissues or impair the circulation in the stump of the pulp to be left in the root.

Third, place the rubber dam, mechanically and chemically sterilize the immediate and surrounding field.

Fourth, anesthetize the pulp (nerve blocking, pressure anesthesia or general anesthetic).

Fifth, have at hand previously boiled all instruments needed, (they are few). These should be placed in fifty per cent. to sixty-five per cent. alcohol.

Sixth, having decided the point of pulp excision, a pulptone is selected, the right angle blade of which is as long as the diameter of the canal at this point. Use fine barbed broach for fine canals. Pass the pulptone to this position and give three or four complete turns in one direction. Then withdraw instrument. In some cases the amputated portion of the pulp will come away with the knife. In case it does *not,* pass a new barbed broach to within one or two millimeters of the cut, give one turn when the amputated portion may be withdrawn. A good hemorrhage is of advantage.

Seventh, check hemorrhage with cold water. If this fails, use adrenalin cautiously.

Eighth, dress canal six to twenty-four hours with phenolized-eugenol, or camphophenique.

Ninth, (second sitting). Apply rubber dam, sterilize. Remove dressing. Bathe canal with fifty per cent. to sixty-five per cent. alcohol. Wash with boiled water.

Tenth, place fine orthodontia wire in canal to stump of pulp indicated by flinching of patient, being careful not to wound the pulp anew. This wire should be passed through the flame before placing in canal. Then X-ray for position of amputation, or in place of the wire use a fine gutta-percha canal point from a dish containing fifty to sixty-five per cent. alcohol, provided the size of the canal will permit as there is less liability of injury to pulp tissue. This will be a guide as to depth of root filling.

Eleventh, when amputation is well up the canal, use root seal and a gutta-percha point. When it is at the floor of the pulp chamber, or no great distance from the point use paste dressing which is:

Liquid—Phenol, one drop; eugenol, one dram.

Powder—Plaster of Paris, ninety-six parts and zinc sulphate, four parts.

Twelfth, we cannot answer the question as to the best point of excision in pulpotomy. For the present we will use deep pulpotomy for large pulps and shallow pulpotomy for very small pulps. We believe it is some place crownwise from the dento-cemental junction.

CLASSIFICATION OF EDENTULOUS MOUTHS AND IMPRESSION TAKING*

BY ANTHONY J. MIELKE, D.D.S., MEMPHIS, TENN.

THIS DISCUSSION of the subject of impression-taking and its modified technic may not add materially to what is already known; yet some useful suggestions may be found in the conclusions which have been forced upon me by practical observation and experience.

In the beginning, it is well to emphasize the fact that the material, to be used for the impression is determined by the physical features of the individual case. One of the most fruitful causes of failure in denture construction is, that the practitioner becomes a slave to a particular material.

In deciding what material to use for maxillary dentures, I know of nothing more helpful than the classification of tissue conditions, as suggested by Samuel G. Supplee. Upper cases, therefore, are divided into four classes as follows:

Class One—Firm ridges covered with a uniform layer of slightly yielding membrane; buccal and labial attachments connected high on broader ridge.

Class Two—Firm ridges and vault covered with tensely drawn membrane. Very small area of soft tissue over the rear third of the hard palate on either side of the median line. Buccal and labial attachments connected close to the crest of the ridge and very definite in movement.

Class Three—Firm ridges. Soft area in the vault, particularly over the rear of the hard palate on either side of the median line. The buccal and labial attachments are connected to the ridge areas by movable soft tissue overlying the buccal and labial surfaces.

Class Four—High or low vaults. Soft ridges or tuberosities. Buccal and labial attachments, either high or low. Vaults, either hard or varying in density.

EXAMINATION OF MOUTH

At the time of examination a record should be made of the various conditions as suggested in the several classes. If any prominent tuberosities or undercuts present, which were not removed at the time teeth were extracted, the case should be referred to an oral surgeon or exodontist for necessary treatment before impression is taken.

SELECTION OF UPPER TRAY

Select most suitable tray as to length and width, determining this by placing it in patient's mouth, noting particularly that tray isn't too high to interfere with the free movement of muscles and tissue at the time impression is taken. In case of tissue or muscular interference, tray should be trimmed to suit the condition. To definitely determine the required length the finished case should be, adapt a small piece of Kerr's Compound across the posterior part of the tray, another piece about the size of a small marble in anterior part, and proceed as though taking a full impression.

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*Read before the Memphis Dental Society, 1920.

After impression has been inserted and adapted, hold firmly and have patient swallow and protrude tongue, chill and remove. Dry tissue in region of hard and soft palate with small piece of cotton, having patient hold mouth open, and with indelible pencil draw a definite line across posterior palate, just where it is desired the finished case should extend. Slightly dampen trial impression in cold water, insert and press gently in place. If the indelible marking has been made sufficiently heavy on the tissue, an imprint will now be on your trial impression. Adjust length of tray to this definite line.

The length of the finished denture is determined wholly by the classification under which it comes. In classes one and two the length should extend to the junction of hard and soft palate; in classes three and four about one-eighth of an inch beyond. This extension is necessary in the latter two classes to accommodate the labial yieldable tissue, by permitting valvular action of the peripheral tissue to yield in proportion to labial tissue, thus preventing peripheral seal from breaking, especially when occluding teeth incisally.

IMPRESSION AND MUSCLE TRIMMING

Having trimmed tray to suit individual case, now spray mouth with a weak solution of aromatic spirits of ammonia to eliminate all mucilaginous saliva, thoroughly dry and paint tissue with adrenalin chlorid, thus causing capillary contraction. Heat about one and a half sheets of modelling compound, preferably Kerr's, in hot water to about 150 to 160 degrees, and adapt this to tray, molding it somewhat higher in center, and remove irregularities, by passing over gas flame to equalize heat. Plunge this in hot water, and, being sure compound can be comfortably applied to tissues, insert in mouth with a definite upward and backward pressure. While compound is still adaptable have patient perform whistling and backward and forward movement of lips. Press gently but firmly downward on labial and buccal tissues, having patient swallow and protrude tongue several times before finally chilling impression. There are three distinct muscular attachments, anterior, middle and posterior, which should be outlined in the impression to accommodate the various movements.

If metal of tray should show through compound, or if there is any apparent muscular strain, trim tray at such points and take another impression until a clean-cut one is obtained.

TREATING IMPRESSION

Trim off excess compound without removing impression from tray. Heat end of chip blower until nearly red hot and apply heated air to ridge of impression, first from molar to cuspid on one side, then anteriorly from cuspid to cuspid, and last from cuspid to molar on opposite side. Make three distinct operations of this, inserting impression each time, and muscle-trim as previously indicated, being sure to thoroughly chill before removing. Always direct heated air outward from floor of impression so as not to distort original outline, other than soften ridge area. If any undue muscular strain is visible after these operations, apply gentle heat at point indicated and muscle-trim again. In some cases where the buccal muscles are not sufficiently strong to properly conform the impression, the buccal ridge usually will be found to be about a millimeter or two too high, often causing abrasion and dropping of finished case.

PERIPHERAL SEALING

There is considerable difference between taking an impression with the mouth open and with it closed. When the mouth is open the soft tissues are distended; when it is closed they are in a state of rest. How are we going to establish an apparent state of rest when taking an open-mouth impression?

After impression has been successfully treated to this stage, roll a portion of black wax (the kind Trubyte teeth are carded on), to about the circumference of a lead pencil; slightly heat end of wax and apply thin film to inner buccal and labial borders of impression from molar to molar region, about two mm. below crest. Insert impression with an upward and backward pressure, having patient close in order to establish as near a closed-mouth impression as possible before final pressure is exerted; then chill and remove. If wax film should become somewhat hard before impression is inserted, apply gentle heat to it and insert while yieldable, proceeding as above indicated. Examine impression carefully for any imperfections, and, if wax is deficient, add more at point indicated and reinsert impression, chill and remove. Remove all excess wax which may be forced onto floor and outer ridge of impression.

POST-DAMMING

With black wax, treated as previously indicated, place a sufficient film from tuberosity to tuberosity, and insert impression with an upward and backward pressure, holding firmly in mouth, and have patient swallow and extend tongue to accommodate the soft, yieldable tissue. Chill, remove and examine for imperfections.

In classes one, two and four, let the width of your post-damming be about one-eighth of an inch. In class three let post-damming extend somewhat anteriorly to get suppression on soft tissue area of vault on either side of median line (refer to class three).

RELIEF

No relief should be made in region of hard palate in classes three and four, as such relief during incision, especially after case settles, causes undue stress on yieldable tissue on anterior ridge. Relief should, however, be made in region of the anterior palatine, and the posterior palatine foramina. These places easily can be determined by passing a ball-end instrument along palate in region of these foramina, until a small depression is felt. Dry the tissue at these points, mark with indelible pencil, reinsert impression and wherever markings show, relieve impression.

Pressure on the nerves and vessels in these areas often cause patients severe headaches, and cases recently have been reported where hearing has been improved by relieving undue pressure on these important areas.

TESTING IMPRESSION FOR STABILITY

Slightly dampen impression, reinsert and test for stability by bringing stress to bear upward on handle of tray. If satisfactory adhesion is established, next test posterior buccal retention, by applying downward stress, somewhat at an angle in region of cuspid, by pulling down on handle of tray. Test impression in general by pulling downward and upward on handle of tray. If there is a tendency to give at any point during testing period, add more wax at place of least resistance, thereby establishing greater adhesion. Reinsert impression each time this is done. Deficient post-damming often can be detected by inserting impression and pushing upward and backward on floor of tray, and listening for an excretion of air. Often, small air bubbles are visible, and when these are detected, dry impression and add small amount of warm wax at such points and reinsert impression.

Plaster may be used in classes one and two, by those who prefer it, after compound impression has been successfully treated as previously indicated. A small film of plaster may be placed in the original impression, and a second impression taken, in which muscle trimming and extension of tongue should be followed the same as in the original. You readily see that peripheral sealing and post-damming retains the plaster within a given area, but even this will not give the desired pressure required in classes three and four.

Personally, I have been more successful with the use of modelling compound in all classes of cases. It has been my experience that more abrasion in the finished case results from the use of plaster as an impression material than from compound. While a plaster impression may seem ever so perfect, there often are unnoticeable imperfections due to complete absorption of moisture. If excessive mucin is present, which is true in many cases, caused either by an unbalanced diet or low-grade systemic infections, small irregularities occur in a plaster impression. These irregularities or imperfections being transferred to the finished case either lessen adhesion or cause unnecessary abrasion. With the use of plaster we have absorption of moisture as stated; with modelling compound this is expressed from between tissue and impression material.

CLASSIFICATION OF LOWERS

Class One—The prominent ridge that is hard all over.

Class Two—The flat hard ridge with prominent muscles, the attachments of which are at least one-quarter-inch from the crest of ridge in the molar region.

Class Three—Either flat or high ridge with movable muscular attachments to crest of the ridge, particularly in the molar region. (In many cases this type has indirect attachments to crest of the ridge through area of movable soft tissue).

Class Four—The flexible or soft ridge with muscular attachments either direct or indirect through soft tissue.

SELECTION OF TRAY FOR LOWER

With the importance of suitable tray selection in mind, examination of conditions governing the classification of lowers should be made with care, and these noted on record slip as previously advised. Having noted essential physical features, a tray which most accurately conforms to the general conditions should be selected. This must be placed in the mouth, and tissue displacement buccally and lingually noted. In case of such displacement trim tray to accommodate free tissue movement, especially in the region of muscular attachments. After tray has been properly trimmed and adjusted to the case, the handle should be turned upward to insure the free movement of labial tissues while taking impression.

IMPRESSION AND MUSCLE TRIMMING

After compound has been heated and treated as previously indicated for uppers, conform accurately to tray and proceed with impression. Insert it with a downward pressure in region of lower cuspids, holding tray firmly while patient swallows several times, protrudes tongue and extends end of tongue upward in molar region first to one side and then the other. Press gently but firmly upward on outside of face in buccal and labial region, thus conforming compound to these tissues. Chill and remove.

Trim excess compound from tray and treat borders with chip blower as indicated in upper impression, including the inner posterior lingual margin, inserting and muscle-trimming until satisfactory.

PERIPHERAL SEALING

Being satisfied that the impression is the best obtainable, add a small film of black wax to inner posterior lingual border beginning at heel of impression and extending lingually all the way around to opposite side, including opposite heel. If wax should become somewhat hard before insertion, apply gentle heat from chip blower, then insert and adapt with slight pressure, holding firmly until thoroughly chilled. Trim excess wax including that which extends into muscular depressions, to a definite line with impression. Dampen slightly in cold water, reinsert and press downward, first on one side and then on the other in bicuspid region, and listen carefully for an excretion of air. Excretion often is detected at heel of impression while exerting this pressure, in which case it becomes necessary to add more wax to heel and inner posterior border of impression, proceeding as previously indicated.

Incidentally it might be said that, where there is any noticeable suction to lower impression it is maintained at just these three points: in the region of each heel and the anterior lingual border. Testing for stability may be followed as suggested in the upper; however the same gratifying result is not assured.

If crest of ridge is knife-like, or yieldable as in class four, often it is well to apply a slight degree of heat from chip blower to this area of impression, reinserting it and procuring a more comfortable impression by placing greater stress on denser tissue. This should be done before peripheral sealing.

MODELS

Having concluded impression-taking, models may be made of any good model plaster or artificial stone which will withstand the heat necessary to adaptation of base plates and the stress incident to vulcanization. Cloverleaf Model Plaster meets these requirements, and impression and models may be separated in about forty-five minutes to an hour with a positive degree of safety.

TEMPORARY CASES

Opinions differ greatly as to just when a temporary plate should be made, and for this reason brief mention of the subject is made here. In my practice I take impressions immediately after teeth are extracted, unless there is an unusual amount of septic discharge; then only do I wait a week or ten days before taking impressions. If at the time extraction is done, all undercuts are removed and excess alveolar process is reduced, impressions may be taken immediately and temporary denture constructed. This insures a more satisfactory result both in temporary and permanent dentures. Definite examination of the mouth should be made and the same care used in selection of tray, as previously indicated. After impression is taken, all socket indentations should be removed from ridge of impression, before treating and peripheral sealing and post-damming. This insures the tissues healing evenly and assures more comfort in the permanent case by eliminating these irregularities. The kind of denture to construct depends wholly on the material of which you intend to make the permanent one. If the permanent case is to be vulcanite, the temporary case should be of same material. If temporary case is made of vulcanite and permanent case should be of metal, it will be found that the metal plate will not have sufficient retention.

Temporary plates should be constructed immediately to prevent atrophy of muscles and alveolar process, enable patient to establish proper bite, stimulate circulation, provide masticatory apparatus, and improve esthetics.

This, in brief outline, is the procedure adopted after extensive clinical experience and careful observation and study in the construction of artificial dentures, as it pertains to the fundamental subject of impressions.

The subject of Denture Retention will be treated in subsequent article.

1206 Exchange Building.

THE RESPONSIBILITY OF THE PUBLIC FOR THE SOLUTION OF CERTAIN DENTAL PROBLEMS*

BY H. E. FRIESELL, B.S., D.D.S., LL.D., PITTSBURGH, PA.

DENTISTRY faces several problems today that are becoming acute. These problems are so extensive in scope that to expect the dental profession, as it is at present constituted, to solve them is to expect the impossible; they are of such grave import to the people in general that the public must assume its share of the responsibility for their solution.

In recent years there has been a general awakening to a realization of the importance of the mouth as a portal of entry for pathogenic micro-organisms, and to the fact that a great many systemic disturbances can be traced directly or indirectly to oral neglect on the part of the patient, or dental malpractice on the part of the dentist.

For many years our leaders have been teaching that anything other than careful, conscientious and skillful dentistry is not only useless but possibly dangerous to the patient. For a time these teachings seemed hopeless and the teachers' voices were verily like "voices crying in the wilderness," with few to hear and still fewer to heed them.

The young man fresh from college, imbued with high ideals and a desire to render the highest type of service in his power, was discouraged by the complacent statement of the older practitioner that "those things are all right to teach in college, but they are not practical; patients will not pay for such services, nor appreciate them." "You can't get fees that will justify that kind of work; so do as I do—give 'em what they want and are willing to pay for, and let them do the worrying."

So the quacks outside the organizations, and the commercial charlatans within, went merrily on gold-toothing and gold-bricking a public even more ignorant of consequences than themselves, until the pendulum finally reached its extreme swing, and Hunter's famous indictment of dentistry came to shock us to a realization of our responsibilities and shortcomings.

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*Read before the Ohio State Dental Society, December, 1920.

What a clamor of protest arose from the dentists of America! And what appeals many of us received to take issue with the accuser and defend the good name of American dentistry! But what Hunter said was only too true.

Of course we know that what he condemned was a type of dentistry that had no business to exist; but it did exist, not only in London, but throughout America; and it exists today in every city and town of this country. It is the type of dentistry that is being done by the unscrupulous practitioner, whether he be an association member or not, who takes advantage of his patients' inability to discriminate between valid service and sham make-believe, and who gives as little as he can for as much as he can get. This type of man sneers at the idea that when a man enters a profession he should consecrate himself and his honor to that profession; that when a state licenses him to practice a profession he assumes an obligation and a responsibility to the people of that state that is something far different from a simple commercial or business relation. In a profession requiring special training such as dentistry, the patient is unable to distinguish between honest service and malpractice, and the practitioner who takes advantage of that ignorance is trebly culpable.

The man who is in practice primarily for the money there is in it, *hasn't any moral right to be a member of a profession.*

The man who performs operations for his patients that are not the best he knows how to do, is worse than a thief, for—to paraphrase Shakespeare, "He who steals my purse steals trash," but he who steals my good health, endangers my life.

The man who spends most of his energy in trying to devise new ways and appliances "for selling his services" to his patients at highest fees, instead of striving to render them increasingly more valuable services, is in the same professional class as the women who indulge in extreme facial embellishments for the purpose of disposing of equally valueless wares.

It is that type of practitioner and that kind of work which has laid dental practice open to such wide-spread condemnation by the medical profession, which itself is not able to discriminate between the real and the sham, and has been inclined to condemn good and bad dentistry indiscriminately.

It is the duty of the conscientious practitioners to eliminate the charlatan from our associations; and it is the duty of the physician and the public to distinguish between the quack and charlatan and the honorable practitioner, and to demand proper dental services.

Dentists alone cannot do this; the public must realize the importance of dental work and refuse to tolerate anything but reputable practice. There is a demand for "safe and sane" dentistry and the help of the public must be thrown on the side of the conscientious dentist. It must recognize that it isn't the advertising of the quack that we object to *per se*; but that the advertising is the red light which is the sign of illicit dentistry. It is possible for anyone to put a red light in front of his door, and there is nothing immoral about the light or its color; but it has become known as the sign of the underworld, just as "advertising" as certainly indicates the practitioner who has nothing to lose. We object to it because it is the snare for the unwary; the earmark of the unscrupulous.

The growing appreciation of the important influence of a healthy mouth upon the general health has brought about a demand that dental disease be controlled more adequately, and has ushered in what might be called appropriately the Era of Preventive Dentistry. Our efforts in the past have been devoted largely to reparative dentistry, but a recognition of the hopelessness of our task upon a quantitative basis alone has convinced us that we must attack the problem at its source.

The care of children's teeth is our most important objective today, and the responsibility of the public in this matter is paramount. Proper instruction in the care of the mouth, and the supervision of this work, must be provided for all school children; not in a haphazard or volunteer way, but as a regular and important part of each child's education.

If, as the writer firmly believes, half of the diseases we suffer from are enabled to gain a hold upon us through neglected mouth conditions, school authorities may properly go to any reasonable expense to provide necessary dental attention for school children. However, instruction in the care of the mouth, and occasional hygienic treatment by the dental hygienist is not sufficient. Pit and fissure cavities cannot be controlled by such measures, and dental clinics in the schools or preferably in infirmaries such as the Forsyth and the Eastman institutions, should be established in suitable centers, either by private endowment or public appropriation. It is not proper to expect the dental profession to bear the whole burden of dental charity; it should be shared by the public.

Another dental problem that is urgently in need of solution is the providing of dental services for all persons who are confined in charity and penal institutions, such as prisons, asylums, public homes, etc. The mouths of such patients are generally in a deplorable condition, and laws should be enacted in every state making it possible to provide adequate dental services for those unfortunates who are unable to have them otherwise. We need someone in this country to awaken the public to its responsibility in this matter as Charles Reade did the people of England in regard to the treatment of their insane.*

The question of public health in recent years has been receiving more and more attention in our most progressive states, and in each State Department of Health there should be a State Dental Director whose business it should be to devise ways and means for providing dental services throughout the state where such state aid and supervision may be properly given. This officer should be a man of experience and broad vision, not simply one more political job holder. He should be responsible in a sense to the dental profession of his state, and not under the supervision of the medical profession.

There is one more dental problem for the solution of which the public must assume much responsibility. It is one that has not been discussed very fully even among dental educators, but it is fundamental in character and will have a direct bearing upon the solution of all the other problems of dentistry. This is the problem of providing a sufficient number of dentists to serve the rapidly increasing demands of our population.

According to the best figures obtainable we have a population of 110,000,000, and 44,000 practicing dentists in America, which equals one dentist to every 2,500 people. If every dentist worked eight hours per day, every working day in the year, he could devote only one hour per year to each patient; an amount of time wholly inadequate. Making all kinds of allowances for patients who cannot and patients who will not have dental work done until nature compels them to do so, we need, as a minimum, five times as many dentists as we have today.

Let us consider our prospects for obtaining this supply. In 1908, according to the best figures obtainable, there were 36,823 dentists in this country; in 1920, we have 44,000, showing a gain of approximately 7,200 in twelve years. In that same period there were 29,542 dentists graduated from all of our dental schools. This gives us an average annual graduating class of 2,272, and an annual average wastage of 1,720. In 1908, we had fifty-seven dental schools, 6,919 students in attendance and a graduating class that year of 1,754. In 1920, we had forty-six dental schools, 9,302 students enrolled, and a graduating class of only 1,042, this being an off year on account of the change from the three-to the four-year course.

At the present time we have but forty-five dental schools, with a student enrollment of 12,249, and a senior class of 1,939. If our annual wastage was 1,754 for the past ten years, the increase in total number of dentists will bring it up to approximately 1,900 on our present basis; so that in the year 1920, we did not graduate enough dentists to overcome that year's wastage, by 899. If we graduate every member of the present senior class in 1921, we will just offset the year's wastage, and

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*(A very casual inspection of reformatories in our own state will convince anyone of the truth and the timeliness of this criticism.—*G. E. H.*)

the same thing will be true for 1922, as our schools have a junior class numbering 1,916 students, being twenty-three fewer than the senior class enrollment.

The change to the four-year course and the two years of war have kept down the number of our graduates during the past three years, so that the number of practicing dentists in the country has really declined during that period.

On the other hand, the great demand for dentistry and the ending of the war have given our schools largely increased freshman and sophomore classes; the former registering 4,461 and the latter 3,933 students. The present sophomore class had a freshman enrollment of 4,392 last year, showing a wastage of 459, which is a normal amount for the first year. The wastage is much less in the upper classes.

Today most of our schools are crowded to the doors; for with twelve fewer schools than in 1907, we have nearly twice the total number of students in attendance. Yet with all this, the demand for dentists is increasing more rapidly than they can be supplied by our present institutions. Universities that are located in logical centers of population should be urged to provide adequate dental education for the communities which they now serve in other educational fields. The public must recognize the necessity for this work, and also must be prepared to endow dental schools that are organic parts of universities, in order that a sufficient number of properly-trained dentists may be provided to supply the needs of the community.

The strides made in dental education during the past six years have been very great indeed, and with the end of the present college year the first four-year class will be graduated. Notwithstanding this rapid advancement, there is a tendency on the part of a few schools to require a year of college work for entrance to a dental school, beginning in the fall of 1921. In view of the great demand for dentists and the limited number of dental schools, the wisdom of requiring a pre-dental year at this time is open to serious consideration. It may be entirely proper for some institutions which have reached their limit of capacity for students to take this advanced step immediately, but for all schools to do so, when so many rural communities and smaller towns are appealing for dentists, is very likely to result in the changing of state dental laws and taking away from dentistry much that it has gained in recent years. The deplorable condition of dentistry in countries where the dental standards have been set by academic rather than practical experience, is also worthy of serious consideration. A timely article entitled, "Graduate and Undergraduate Instruction in Europe and America" from the pen of Prof. Alfred Gysi, of Zurich, Switzerland, appears in the November number of *The Journal of The National Dental Association.* Its careful reading is recommended to every dentist and dental teacher who is interested in the future of our profession, as it depicts conditions that have arisen in several European countries as a result of educational procedures, which some members of our profession would like to see introduced in this country. The quotation of one paragraph from Dr. Gysi's paper will serve as a fitting closure to this address:

"As a teacher from one of the countries where social unrest is much greater than you could understand without living there, and where such forces are boiling just below the surface that it is by no means sure that the worst has yet come to pass or even been prophesied, I can bring you no better message than that you should use the utmost care and thought to avoid the development of any system of dental education which will *separate the interests* of the men whom you train from the interests, feelings, thoughts or actions *of the public whom they serve.* And let me caution you, also, to be very careful about putting hindrances in the way of training enough dentists to satisfy the reasonable demands of the population."

Highland Building.

AFTER-PAIN FOLLOWING THE USE OF CONDUCTIVE ANESTHESIA*

BY RALPH H. FOUSER, D.D.S., SALEM, S. D.

CONDUCTIVE ANESTHESIA has the distinction of being one of the most important factors in the development of the present high state of perfection of our modern methods of dental practice, but there is still much to be desired, which will be developed with our ever-increasing experience. And of the many methods and fads of modern dentistry, conductive anesthesia has held to an ever-increasing popularity especially when its use rests upon the scientific basis with which it must be employed to insure the greatest degree of success.

Nearly all of the profession have had access to a knowledge of conductive anesthesia. The technic is mastered with study and experience, but there is one feature of this method of anesthesia that is a most important one in our complete success, and it is one that has many times been neglected, but often has given us serious concern, *e. g.*, the pain following the operation, which many times may be prevented with a little more study and care in our use of this method of anesthesia, as the successful termination of local anesthesia is not only a complete anesthesia but the elimination of the after-pain to as great extent as possible.

Post-operative pain may be due to several causes, and it should be the effort of the operator to find these causes and eliminate them as nearly as possible to obtain a minimum of after-pain. One of the most frequent causes is surgical trauma from the manipulation of the tissues in the operative procedure and traumatic injury to the bone and bone process, such as excessive pressure with elevators in the extraction of broken-down roots and surgical extractions, also in alveolectomies where ragged edges of the process are left, with the tissues sutured too tightly over the edges, setting up an irritation and causing a reflex which can give the patient much distress. Also dressings that are placed following surgical operations in the mouth, and in cases of inflammation where the dressings are placed too tight there can be set up severe irritation and pain; but with a careful check of all these causes, and with them eliminated to as great an extent as possible, we can look to our anesthetic and our technic for a further check to minimize our after-pain which may be due to this source. And in conductive anesthesia one of the greatest sources of after-pain is faulty technic. Snyder states that only about ten per cent. of the men using conductive anesthesia know the technic. So to eliminate these troubles it would be by mastering the correct technic, with careful training, study, and experience.

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*Read before the First District Dental Society, Vermillion, South Dakota.

Some of the most frequent causes for trouble with the injections are due to using an improper aseptic technic, carrying infections either by unsterile needles or from unsterile syringes, by way of the solution into the deeper structures, setting up an infection the intensity of which depends entirely on the virulence of the infection and the resisting powers of the tissues of the individual; but to guard against such an unpleasant occurrence the operator should give most careful attention to these aseptic details. Also injecting into the muscle tissue, which owing to its vascularity absorbs the solution only slowly, causes a traumatic irritation from the presence of a foreign solution within the tissues, which is due to inserting the needle in an improper position, and is a common mistake with some operators when following the technic as originally given by Fischer, as they insert the needle too far mesially from the retromolar triangle; also, this is a common mistake made by beginners (Blum). The use of solutions too hot or too cold is a mistake and so is injecting too rapidly, which forces the solution into the tissues, and does not give them time to take up the solution and give way to the extra fluids within the tissue cells.

There are also other reasons for slow injection, which are free from the too rapid absorption of the suprarenin content in the anesthetic producing its disturbing conditions. Potts states that the poisonous effect upon the patient depends not so much upon the amount of drug used or its strength, as upon the concentration of the drug in the circulating medium, the blood. Thus if one or two cc. be suddenly injected directly into a vein, the effect of this volume upon the vital centers through which it passes will be rapid and pronounced. Consequently, one should inject the drug slowly.

The symptoms produced by a toxic dose of novocain are many times similiar to those manifested in syncope. But syncope is rarely of long duration, and recovery so complete and its occurrence so frequent, I think we are justified in assuming that the most of these disturbances are psychic and not toxic, and I might state that I have seen less disturbances of this nature where a tablet is used, making the solution to contain a smaller amount of the suprarenin content; but, of course, our anesthesia is of a corresponding shorter duration, as it is the action of the suprarenin upon the blood vessels that confines the anesthetic to the areas injected, or to the areas supplied by the nerves that we are blocking.

Potts also states that, "So far as I know, no serious ill effects have followed the injections of doses such as are given hypodermically in anesthetic mixtures of adrenalin."

Another condition of quite common occurrence following the use of a local anesthetic containing suprarenin, is that of ischemia, which is a constricting of the blood vessels from the action of this drug, and a dry socket results. This condition is more common following the infiltration of the tissues for extractions than when we use the conductive method; so attention should be given to this condition to be sure that a good blood clot forms, and in cases where it does not, one should slightly curette the walls of the sockets to produce bleeding, so the normal clot will form; and in some of these cases that return for treatment it will be necessary to clean the old clot from the socket and produce more bleeding, and pack with a dressing of iodoform gauze with some anodyne antiseptic, which will relieve the condition.

Now the other cause for post-operative pain following the injections, with the results of faulty technic eliminated, is from using a non-isotonic solution—and about the best place to find out if one is getting after-effects from the injections using conduction anesthesia is in cavity preparation.

Most of the pain following injections is due to a direct injury or changing of nerve cells, and also of the cells in muscle tissues; but the nerve tissues are of great concern to us as most of our injections for block anesthesia are made in the neighborhood of the nerve trunks.

It is a known fact in physiology that the cells and tissues made up from the cells are of a known and definite construction, and they must maintain that balance to be normal tissues; and any deviation from that normal tends to produce an abnormal condition, which, if long continued, brings about a condition of which the outward manifestations are pain; therefore, one of the very first considerations in the avoidance of this condition, productive of pain, is not to bring about this abnormal condition of the tissues in so far as possible to avoid it.

Tissues have certain laws for the taking up of solutions, of which the law of osmosis governs the absorption of fluids in the tissues; and as the cells are of a definite balance, any changing of the tissue cells by this process of osmosis is sure to bring about a condition of pain, which will last to just such a degree and length of time as the solution has brought about the change in the tissue cells. As the cell contents are composed largely of water and salt ingredients, when we inject solutions into the tissues they must be: *First,* made up from sterile distilled water, and *secondly,* must consist of the proper balance of salt constituents, as are the cell contents.

The six per cent. or nine per cent. solutions were tried and found that they were not isotonic. Then the Ringer solution was used and probably gives the most success of any solution universally used (Snyder). It consists of sodium, calcium, and potassium salts in the proper proportions to balance the salt constituents of cells, which give us what we term the "isotonic solution."

The living cell is surrounded by a semipermeable membrane. This membrane will permit only the diffusion of water, but not salt ingredients. If, therefore, the injected solution is *hypertonic,* (richer in salt constituents than the cell contents) the water from the cell will escape into the injected solution and the cell will shrink. If, however, the injected solution is deficient in salt constituents or *hypotonic,* the reverse will take place, namely, the water will penetrate into the cell through the walls, and the cell will swell. In either case death of the living cells will ensue, causing sloughing and pain (Nevin). While, if solutions made of the isotonic balance are injected into tissues and sections made from the tissues and placed under the microscope, they will show no pathology other than a slight disarrangement of cells, which is brought about by the process of osmosis, which as before mentioned is a physiological process.

We must therefore draw from this conclusion that it is a very important part of our technic in the practice of conductive anesthesia, to give the utmost attention to these seemingly unimportant details; and it is the oversight of these small details that many times robs us of complete success with our practice of anesthesia; as there is only one solution to use in making these injections around the nerve trunks, and that is a sterile, distilled, isotonic, novocain-suprarenin solution, of the proper temperature, which is body temperature.

So in the avoidance of the after-pains following the use of conductive anesthesia, we must avoid the practice of the causes that are productive of these conditions, and we will have advanced to a higher state of perfection one of the methods that has been a blessing both to the patient and the operator, namely, Modern Conductive Anesthesia.

REFERENCFS

Blum: Mandibular Anesthesia.
Braun: Local Anesthesia.
Nevin: Conduction and Infiltration Anesthesia.
Snyder: Notes on Conduction Anesthesia.
Potts: Outward effects following Local Anesthesia.

THE STORY OF A STUDY CLUB

BY DR. MAX FENDLER, ST. LOUIS, MO.

(For The Dental Summary)

THE ST. LOUIS STUDY CLUB has injected a serum of cheer and understanding among the dental profession of St. Louis. Anemic dispositions have become red-blooded through the welding and adjustment of the proper mental attitude relative to the unselfish aims and high purposes of an organization where personal aggrandizement has no part, and service to one another becomes paramount. The air of mental restraint and stagnation of the past has become disinfected that all men of the profession may breathe its wholesome influences enabling him to set his feet upon the highway of progress, his head high in the resolve to be more worthy of the great trust placed in him.

Men's hearts beat about the same everywhere. A little help, a word of encouragement, and a stimulus for good becomes at once apparent; the mental and moral fibre of the man has become energized, his larger vision has been opened through the knowledge afforded him by the organization of this free educational institution of dentistry.

HISTORY OF ORGANIZATION

The monthly bulletin of the St. Louis Society of Dental Science, January meeting, 1919, contained the following item: "The study club is here. This will be welcome news to the society members who realize that the new era in dentistry has brought greater responsibility as well as new and advanced ideas in root-canal treatment, crown and bridge work, pathology, bacteriology, etc. Your society has a practical plan which will be submitted and discussed at this meeting, giving the members an opportunity to receive special instructions on these subjects."

As a result of this meeting it was unanimously voted to take up the study of "Attachments to Vital Teeth." The following men joined the class as charter members: Drs. Max Fendler, chairman; Geo. B. Scott, E. Terhellen, A. Engle, O. Fruth, L. Duguay, Chas. P. Grosby, E. N. Beall, E. R. Hart, Malcolm Robb.

This group had its initial meeting Wednesday, February 19, 1919, at eight P.M. at the St. Louis Dental Department, and was addressed by Dr. Frank C. Rodgers, president and organizer, on the responsibility and obligation of the student, in part as follows:

"A man joining a class is in honor bound to abide by the rules formulated for that class. These rules are based on the ordinary principle of rules applied to students in school. He must be present at each session, accept the instructions as given by the demonstrators without criticism, or the injection of his own personal ideas. In other words, assist in building up the class spirit and teamwork."

This principle has been the keynote and morale of the student and has played no small part in laying the cornerstone for this practical, successful post-graduate dental organization.

The instructor, Dr. Malcolm Robb, gave his technic for making an attachment to a vital cuspid tooth.

The following class night, each student presented himself with a finished attachment as demonstrated by the instructor, which he examined individually. The enthusiasm and success of this, the first class of the study club, being so pronounced, the following instructors eagerly were sought, and they responded with a unity of purpose which added zest and spirit to this unique educational undertaking: Dr. E. R. Hart, Shoulder Crown Technic on Vital Teeth; Dr. Otto J. Fruth, Inlay Attachments to Vital Teeth, Rests, etc.; Dr. J. D. White, Inlay Attachments to Non-Vital Cuspid Teeth; Dr. L. Niehoff, Lingual Bar Partial Denture; Dr. W. A. Chamberlain, Modern Root-Canal Technic, including Ammoniated Silver Nitrate Method.

FALL TERM, 1919-20

The catalog announcing the Fall Term of the St. Louis Study Club Post-Graduate Courses, 1919-20, further awakened the local profession to a full realization of the scope and progressive tendencies of the plan of this organization as follows:

"The post-graduate courses as given by the St. Louis Study Club, are for the benefit of all ethical members of the profession. The only requisite necessary to join the club is a sincere desire to improve your efficiency by giving up part of your leisure time.

"The main feature of each course is to give practical results for the least expenditure of time.

"The classes will meet on different nights, which arrangement makes it possible for students to take up more than one subject. Experience has proven it best to limit the number of students; owing to this condition a student should not join a class if there is any doubt of his having the time to attend the sessions. Non-attendance at two consecutive sessions will indicate a lack of interest on the part of the student and his name will be dropped from the roll."

SUBJECTS FOR STUDY

The subjects for study and their synopsis contained in the catalog were outlined here: Porcelain Technic, Porcelain Root Bridge, Crown and Bridge Work, Radiodontia, Root-Canal Technic, Conductive and Local Anesthesia, Full Dentures, Diseases of the Mouth, Bacteriology.

The enrollment now numbers 120 students.

The classes were rapidly filled with eager, aggressive men enthused with an opportunity which would assist in lifting them up to a larger understanding of modern standards as applied to every-day practice.

A chairman for each class was chosen to act as understudy and assistant to the instructor; duties being to obtain clinic material for class work, look to the morale of the student, compile a report of the class lectures to be read at the conclusion of the term and published in book form for reference.

The completion of the fall term was marked by a clinic of all classes, followed by a dinner at which reports in the form of essays were read by the chairman of each class.

Dr. Frank C. Rodgers presided as toastmaster, and was given an ovation, the warmth and sincerity of which must have made him feel that his self-sacrifice, energy and constant application to an ideal, had not been in vain. He had, up to this time, by his personality and force, shouldered the responsibility of conducting the policies of the study club, the weight of which would be distributed to others who would assist in carrying on the work through the organization of the St. Louis Club Alumni Association, now affected, with the following officers:

Dr. F. C. Rodgers, permanent honorary president; Dr. J. P. Marshall, president; Dr. E. P. Dameron, vice-president; Dr. J. F. Alcorn, secretary; Dr. George B. Scott, treasurer; Dr. Max Fendler, registrar and historian.

OBJECT, MEMBERSHIP, INITIATION FEES AND DUES OF THE ALUMNI ASSOCIATION

The object of the alumni association is to bring the profession of dentistry to a higher plane by forming and maintaining study groups, through which the individual dentist can increase his knowledge and broaden his views on the various technical and scientific subjects pertaining to the profession.

Any ethical dentist who has completed a course in any one of the classes is, upon payment of fee, eligible for membership in the St. Louis Study Club Alumni Association.

The initiation fees and dues shall be three dollars ($3.00) payable upon entrance into any of the classes. Anyone may take two or more subjects concurrently, without additional fee.

CLINIC AND LECTURE BUREAU

As an outlet for the activities of the study club, a clinic and lecture bureau was organized April 8, 1920. Dr. C. O. Simpson, president; Dr. Val Frederick, secretary. The object and plan of this bureau being to create and provide clinicians for the various state dental societies requesting clinics. Preference is given to those members of the study club who have shown unusual efficiency in their respective classes.

Nineteen requests for immediate clinics have been received. Nine clinicians have been sent out, and nine more are booked by the secretary to clinic in the near future. Requests have been received from Texas, Missouri, Illinois, Arkansas, Oklahoma, New Mexico and Massachusetts. The entire expense account of the clinician is refunded to him by the society calling.

FALL TERM—1920-21

The following letter and card was mailed by the registrar:

St. Louis, Mo., Sept., 1920,

Opportunity Again Calls

The St. Louis Study Club announces its Fall Term.

It becomes at once compulsory if you would keep abreast of modern standards of dentistry, to so fit yourself by attending classes, to merit the growing demands expected of you.

The sentiment voiced by graduates of the study club, has been a stimulus for renewed effort on the part of the faculty. several new subjects being added to make the curriculum attractive to all.

Take mental stock of your deficiencies. Enter this league of progressive men, to further the service you owe to your patients, your conscience, and to the uplift of your profession.

The study club has arranged the following subjects which will begin the second week in October:

Removable Bridge Work, Fixed Bridge Work, Gold Shell Crowns, Inlays and Cavity Preparation, Full Dentures, Porcelain Technic, Root-Canal Technic, Periodontia and Oral Diagnosis, Conduction and Local Anesthesia, Radiodontia, Pathology and Bacteriology, Dental Economics.

Enclosed card for your convenience.

Kindly enroll my name in Fall Term of St. Louis Study Club, as per subjects checked below:

....Removable Bridge Work.
....Fixed Bridge Work.
....Gold Shell Crowns.
....Inlays and Cavity Preparation.
....Full Dentures.
....Porcelain Technic.
....Root-Canal Technic.
....Periodontia and Oral Diagnosis.
....Conduction and Local Anesthesia.
....Radiodontia.
....Pathology and Bacteriology.
....Dental Economics.

Name...
Address...
Phone No....................

Enrollments made in order of receipt of application. You will be notified of your assignment at an early date.

In response to the above mailed announcement, 170 cards were received by the registrar, classified as follows:

42 Students—Removable Bridge Work.
31 " —Fixed Bridge Work and Gold Shell Crowns.
42 " —Inlays and Cavity Preparation.
53 " —Full Dentures.
17 " —Porcelain Technic.
15 " —Root-Canal Technic.
16 " —Periodontia and Oral Diagnosis.
66 " —Conduction and Local Anesthesia.

27 Students—Radiodontia.
15 " —Pathology and Bacteriology.
10 " —Dental Economics.

In the full denture and conduction anesthesia classes, the number of students was limited to fifteen. The balance of applicants for these classes being placed on a waiting list to be assigned for the spring courses in order of enrollment.

The conduction class instruction included various methods of producing local and conduction anesthesia. Practical instructions being given in selection of syringes and needles, making of solutions, sterilization of instruments used, modes of application, etc.

A skull was used to demonstrate landmarks followed in nerve blocking, lectures upon osteology, anatomy, neurology, and pharmacology, etc.

A quiz was held each class night, followed by a written examination, at the expiration of which time each student was required to make injections under the watchful eye of the instructor upon clinic patients, one hundred and twenty-five being obtained by placing an advertisement in the daily papers. Five to six class nights being devoted to this practical application.

INSTRUCTORS

The instructors of the study club, those distinguished big-minded men of the local profession, have, by their loyalty, integrity and devotion, made this institution possible. They have brought the light of truth from under cover that its rays may shed a benediction to all coming under its influence.

Greater love has no man than he give himself without stint, when hand and brain are worn with the duties of an exacting profession, that his fellow brethren may rise to their full height, a monument to their calling, a blessing to all the children of men.

Dr. J. D. White
Dr. Otto J. Fruth
Dr. Malcolm Robb
Dr. E. R. Hart
Dr. E. B. Owen
Dr. Geo. B. Scott
Dr. W. A. Chamberlain
Dr. Virgil Loeb
Dr. A. C. Engel
Dr. C. O. Simpson
Dr. Harry Bloch
Dr. R. Summa

IMPRESSION FOR FULL UPPER DENTURE

BY C. H. WOOLGAR, M.D., D.D.S., MAGDALENA, N. M.

(Written for THE DENTAL SUMMARY)

THE IMPRESSION METHOD HERE PRESENTED is for constructing a full upper denture. As far as I know it is new. In my practice and in the practice of a friend where the technic was carefully followed, it was possible to get perfect adaptation in all upper dentures. The technic is as follows:

Take a stock tray a little larger than the upper jaw, that distally extends back on to the soft palate, soften some impression compound and take an impression of the upper jaw while the compound is still soft; with the index finger press the compound upward and forward on the soft palate, hold it until the compound commences to harden. It is not necessary that this impression be absolutely accurate; it is important that the compound be forced upward and forward on the soft palate; remove the impression from the mouth and make a cast with impression plaster; little time is required for the cast to harden. When it is removed from the impression the cast will be somewhere near correct, but it is not necessary to take any great pains with it; it will give a fair outline of the jaw. With the blow-pipe heat an upper piece of Groft's Base Plate, adapt it to the cast, pressing it down tightly along the periphery and across the junction of the hard and soft palate; while warm trim off excess of base-plate with a pair of scissors and smooth edge with a vulcanite file; the thumb should be kept damp when adapting the base-plate to the cast. When the base-plate is cool remove from the case, place in the mouth; the sides of the base plate should extend as high as the attachment of the labial and buccal muscles and distally on to the soft palate, but at no point should it cause pain; if the adaptation is perfect along the entire edge, it will be found difficult to remove the base-plate from the jaw.

If it fails to adhere, the cast is scraped along the edge corresponding to where adaptation is poor on the jaw; place the base-plate on the cast and re-adapt it to cast, remove base-plate and try in the mouth. This is repeated until the base-plate adheres to the jaw but causes no pain; have the patient move the muscles of the mouth; if there is pain remove base-plate and relieve excessive pressure. If the base-plate can not be made to adhere to the jaw, you can not make a denture that will be satisfactory; something worth knowing before you construct a plate. We now have the base-plate constructed of Groft's Compound; the same we shall use for a tray; this tray fits this individual case. Remove tray from the mouth, warm tray slightly, place in tray a thin layer of softened modelling compound, take impression of the jaw using quite a little force in taking the impression, especially flat jaws, remove the tray and cut away surplus compound along the edge of the tray; repeat the operation until a satisfactory impression is obtained. It is surprising how easily flat jaws with little ridge can be fitted with satisfactory plates. When taking the impression with modelling compound of jaws with high palates and high labial and buccal sides the tray sometimes springs or splits on the posterior edge; this may be overcome in the following way: Increase the thickness of the Groft's Compound by uniting two pieces of Groft's Compound with heat, or by filling the lingual side of the tray with impression plaster; also where the modelling compound does not flow easily at a low temperature substitute beeswax. The modelling compound for this work should flow easily at a very low temperature. If the above technic has been followed carefully a denture constructed on a cast of Spence's Plaster will be satisfactory as far as fit is concerned.

HOME TREATMENT OF THE MOUTH

BY E. H. BRUENING, D.D.S., OMAHA, NEBRASKA

(Written for The Dental Summary)

Note—The following is the result of a review of many articles, pamphlets issued by industrial institutions and books on this subject and gotten up with the idea of saving our time by asking our patients to read these answers. Copies may be made.

DO YOU WANT TO IMPROVE YOUR HEALTH? Do you want to keep well? Sir William Osler, the greatest authority on internal medicine, recently said, "There is not one single thing in preventive medicine that equals mouth hygiene and the preservation of the teeth."

It is very important that everyone should consult his dentist as to the best way to take care of his mouth and teeth with the fundamental idea of preventing infection, locally and systemically.

The following are brief answers given in a very general manner, to questions that frequently are asked of the dentist. These answers may not be complete enough to fit your case, therefore, be advised, and faithfully follow your dentist's instructions. Every case is different and requires different treatment as to details.

WHY SHOULD I USE A TOOTH BRUSH?

To try to prevent disease. Nearly all diseases of the general system enter the human body by way of the mouth. There are natural substances in a healthy mouth that destroy disease germs and their products. Mechanical cleansing is necessary on account of the kind of food we eat. Hard and fibrous food substances that require thorough mastication are great aids in keeping a normal mouth clean and healthy. Soft foods that do not require chewing, find lodgment on and about the teeth and must be removed with a brush by washing. It requires a careful, vigorous use of a small-sized, rather stiff brush to remove the slimy deposits from the teeth and gums.

HOW OFTEN SHOULD A TOOTH BRUSH BE USED?

At least twice a day. Before breakfast, to remove the material that may be deposited during the night, and before going to bed in order to remove what may have accumulated during the day. Some food substances begin fermentation in two hours. This process forms an acid that can dissolve tooth substance, causing decay of the teeth. Some cases require more frequent treatment.

WHAT IS THE BEST KIND OF TOOTH BRUSH?

One that is about an inch long, with a generous supply of the best grade of stiff bristles, firmly mounted. Loose bristles in the mouth are very annoying and sometimes dangerous, so do not use a brush after its bristles become loosened. Long bristles on the far end are not desirable because when using this brush in the back part of the mouth they bend and do not clean properly. Brushes of this kind can be improved by trimming with a pair of shears. The use of two brushes is often necessary. One becomes too soft before the work is satisfactorily completed.

HOW SHOULD THE BRUSH BE USED?

Place the brush on the gums and brush downward on the upper jaw and upward on the lower, to stimulate the gum tissue and clean the surfaces of the teeth as one would sweep the cracks in the floor. This must be done slowly and carefully on both the inside and outside of all the teeth. Include also the roof of the mouth and the tongue. Then brush the biting surfaces of the back teeth with an in and out motion, and give the molars a few horizontal strokes to remove any substance that may cling to the surfaces near the gum lines, more especially on the inside of the lower molars. If it is difficult to reach the outer surfaces of the upper third molars (wisdom teeth) when the mouth is held wide open, try partially closing it. This relaxes the muscles and allows more space for the brush. These surfaces very often decay in otherwise clean mouths. It requires fully three minutes to brush the teeth properly. Mechanical cleansing must be depended upon to get the best results. No antiseptic drugs will do this for you.

WHAT PREPARATION SHOULD BE USED ON THE BRUSH?

In many cases, none is necessary. Any paste or powder that is not gritty, not too highly flavored, and does not produce a burning sensation. Liquids should usually be diluted when used as a mouth wash. Normal salt solution is effective and safe to use in all cases. This is prepared by putting a small teaspoonful of salt in a glass of water.

HOW CAN TOOTH BRUSHES BE KEPT CLEAN?

Sprinkle a little salt on them and hang them in the sun to dry. Occasionally wash them by rubbing two brushes together with soap.

HOW SHOULD DENTAL FLOSS BE USED?

Only as your dentist advises. Harm may result from improper or unnecessary use of this material.

SHOULD ONE USE A MOUTH WASH?

Yes, frequently. After brushing and after each meal, force water or normal salt solution between and around the teeth by a vigorous action of the tongue, lips and cheeks. The solution should be used cool. Drugs are unnecessary.

First National Bank Building.

> *Men are valuable* just in proportion as they are able and willing to work in HARMONY with other men. —*Elbert Hubbard*

FUNDAMENTALS OF OPERATIVE DENTISTRY*

BY W. H. O. McGEHEE, M.D., D. D. S., CLEVELAND, OHIO

PROFESSOR OF OPERATIVE DENTISTRY, DENTAL PATHOLOGY AND THERAPEUTICS, AND SUPERINTENDENT OF CLINICS IN THE DENTAL SCHOOL OF WESTERN RESERVE UNIVERSITY.

TREATMENT OF EROSION, ABRASION, AND INTERPROXIMAL WEAR

EROSION OF THE TEETH

BY EROSION of the teeth is meant their chemical or chemico-mechanical wearing away, in such a manner that broad, shallow, smooth, highly-polished excavations or depressions are made in the enamel and dentin, on surfaces not subject to mastication. The condition usually is confined to the labial surfaces of the anterior teeth (*Fig. 232*), though it may involve the labial and buccal surfaces of the entire denture.

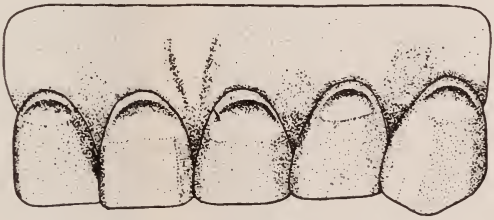

Fig. 232—Erosion.

The condition is an entirely separate process, and exhibiting other appearances than those seen in caries. The causes are also of a totally different nature. No attempt will be made here to discuss, in detail, the etiology and pathology of the disturbance, that phase of the subject being out of the province of this work. However, the causes may be briefly summarized as being due to a combination of mechanical and chemical factors, as follows:

CAUSES OF EROSION

First, Mechanical Factors:

The action of the muscles of the lips and cheeks, and of the tooth brush against the affected surfaces.

Second, Chemical Factors:

A Acid sodium phosphate excreted from the labial glands.

B Acid calcium phosphate from the same source.

C Diseases of sub-oxidation, resulting in the excessive formation and elimination of the above substances.

D Excess of lactic acid in the saliva, producing not the typical form, but a general erosion of all the teeth of the denture.

E Excessive use of extraneous acids (lemon juice, vinegar, grapefruit, and grapes).

F Acid vapors from nitric and sulphuric acids, acting in the mouths of workers in factories where these acids are largely used or manufactured.

As a rule, the progress of the affection is very slow. As a result of the mechanical factors mentioned, the affected surfaces usually are highly polished. When the dentin becomes exposed, tubular calification frequently occurs (resulting in solidification), and discoloration often is seen. Hypersensitivity may be marked, or in some instances almost absent.

The *Treatment* of the condition may be both preventive and restorative in character.

456. Describe the *Preventive Treatment of Erosion.*

Since the condition is a local manifestation of constitutional disturbance, its prevention should of necessity be both general and local in character.

First, general preventive treatment. The institution of an antigout regimen, including such features as regulation of the diet, exercise, fresh air, massage, Turkish baths, and the administration of diuretics, cathartics, and tonics is important. Administration internally of sodium bicarbonate, ten to thirty gr., sodium chlorid, thirty to forty-five gr., or sodium phosphate, one dr., three times a day, is of value. Plenty of pure water should be drunk; or as a substitute, lithia water, or lithium citrate, five gr. in water, at meals.

Second, local preventive treatment. Use alkaline washes three or four times a day, or milk of magnesia, or a paste of prepared chalk and essential oil locally at bedtime is indicated. Robinson's remedy, or zinc chlorid for relief of hypersensitivity is of value. Frequent painting of the eroded area and of the gum with saturated solution of silver nitrate is also advised. The discoloration produced by silver nitrate is removed by painting the affected surface with tincture of iodin, to be followed with ammonia water. For relief of hypersensitivity, Black advocates occasional heavy burnishing of the surface with a dull plug-finishing bur. Stiff tooth brushes and gritty dentifrices should be abandoned.

457. Describe the *Restorative Treatment of Erosion.*

If the case has progressed far enough to necessitate operative interference, extend the cavity margins well beyond the eroded area and insert silicate, oxyphosphate, gutta-percha or gold fillings, or porcelain inlays.

ABRASION OF THE TEETH

By abrasion is meant the mechanical wearing away of the teeth. It occurs most frequently on incisal and occlusal surfaces. (*Figs. 233, 234, 235 and 236*). It may also affect the contact points (interproximal wear); the labial or buccal surfaces (tooth-brush abrasion); as well as the labial, buccal and lingual surfaces, in cases of wear incident to excessive overbite (*Fig. 237*), or as a result of the action of clasps and artificial dentures.

The *Causes* of the condition may be mentioned as follows:

First, habits, such as chewing tobacco or gum, the betel nut by natives of certain tropical countries, or tooth picks; excessive gritting of the teeth; frequent use of a pipe in smoking.

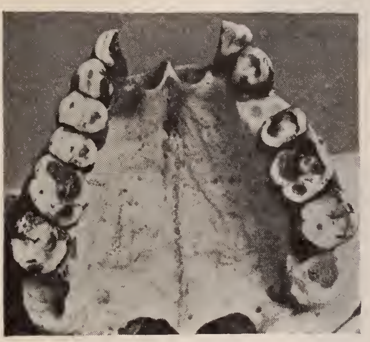

Fig. 233

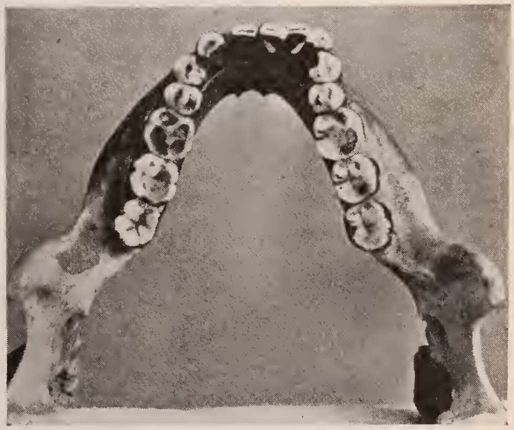

Fig. 234

Fig. 233—Abrasion of the upper teeth.
Fig. 234—Abrasion of the lower teeth.

Second, ill-fitting plates and clasps, producing constant wear on the affected surfaces.

Third, excessive mastication of coarse foods.

Fourth, excessive use of coarse bristle brushes and gritty dentifrices (tooth-brush abrasion).

458. Describe the *Preventive Treatment of Abrasion.*

A Avoid ill-fitting metal clasps and plates.

B Discontinue the habits of chewing tobacco, the betal nut, the toothpick and others of similar nature.

C Avoid gritty dentrifices, coarse bristle tooth brushes, as well as excessive use of brushes and dentifrices of all kinds. Some patients are over-enthusiastic in this regard and frequently do great injury.

D If due to gritting of the teeth, administer bromides, apply an interdental splint, for use at night, and treat the cause.

Gritting of the teeth at night in children is often due to vesical irritability, hyperacidity of the urine and rectal parasites. Render the urine alkaline by the administration of potassium salts and restriction to a vegetable diet; reduce irritability of the bladder with belladonna; remove rectal parasites with vermifuges and rectal injections.

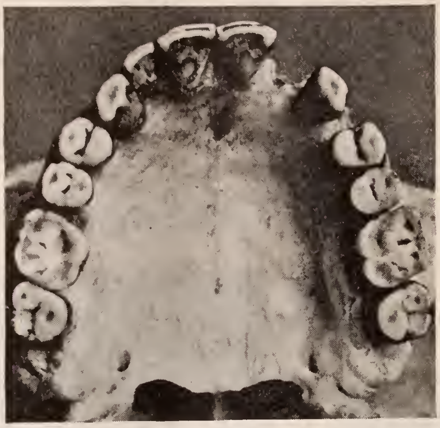

Fig. 235—Abrasion of the upper teeth.

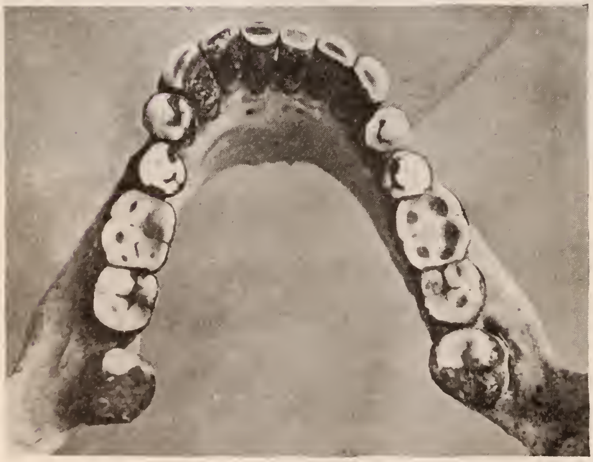

Fig. 236

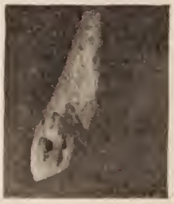

Fig. 237

Fig. 236—Abrasion of the lower teeth.
Fig. 237—A peculiar type of abrasion due to irregular alignment of the teeth.

459. Describe the *Restorative Treatment of Abrasion.*

A In the milder cases, endeavor to limit the lateral excursions of the mandible, excessive movements of which frequently are present, by the insertion of judiciously placed gold or platinum-gold fillings or inlays, building up a cusp here or there with this purpose in view.

B In cases of moderate wear of occlusal surfaces, the operation of "shoeing" may be resorted to, cutting cavities in the abraded surfaces and placing gold, or platinum-gold fillings, or inlays, making no attempt to restore original tooth forms. Anchorage frequently may be obtained for these operations by insertion of gold screw posts, without necessitating the devitalization of the pulp, although in some cases removal of the pulp is required.

C In extensive cases of great wear, the operation of "opening the bite" may be attempted, placing gold crowns on the posterior teeth, bridges or plates in any existing spaces, and building up and restoring to original form the anterior teeth with fillings or porcelain crowns.

INTERPROXIMAL WEAR OF THE TEETH

Interproximal wear is a form of abrasion, consisting in abnormal wearing away of the contact points as a result of a constant sliding against each other of approximating teeth, during the act of mastication. The contact points become worn and flattened, frequently presenting well-marked facets, in consequence of which condition a drifting together of adjoining teeth occurs, and a shortening of the total length of the arch results, thus diminishing the total masticating surface.

SYMPTOMS OF INTERPROXIMAL WEAR

The contact points are worn and flattened. Packing of food into the affected interproximal spaces occurs, causing discomfort to the patient. As a result, fermentation and putrefaction of the food occurs, ultimately producing cavity formation, gingivitis, resorption and destruction of gum, pericementum and bony tissue, with general pyorrheal disturbance. In the early stages, tumefaction, redness and tenderness of the gum are the most noticeable symptoms; later, absorption, accumulation of food debris, pus formation and concomitant conditions may and frequently do supervene.

461. What three *Conditions* may *Produce Symptoms Similar* to those arising from interproximal wear?

A Malpositions of the teeth.

B Abnormal form of proximal surfaces.

C Loss of one or more teeth, with consequent drifting and establishment of wide interproximal spaces.

TREATMENT OF INTERPROXIMAL WEAR

Establish normal contact points. Separate the teeth, prepare cavities and insert fillings, building the contact points overfull to allow for possible wear. Treat the affected soft tissues by the application of antiseptic, astringent, stimulant preparations. If similar interproximal conditions are the result of irregularities, abnormal proximal surfaces, or loss of teeth, with consequent drifting, appropriate treatment to remove the cause or remedy the condition is indicated, viz., treatment of irregularities, widening existing spaces where teeth are lost, insertion of bridge work and restoration of perfect contacts.

REPORT OF THE COMMITTEE ON DENTAL SCIENCE AND LITERATURE

CALIFORNIA STATE DENTAL ASSOCIATION

(For The Dental Summary)

FOREWORD

This committee was organized by Dr. Louis Graham, president of the California State Dental Association, to serve what he believes to be a very useful and important function. The busy dentist finds it difficult to keep up with the great quantity of dental literature published and does not wish to waste time in reading articles that are not meritorious.

This committee is designed to serve you by reviewing periodical literature; choosing the material which it deems of most importance and presenting this information as briefly as possible. Abstracts on several of the different phases of dentistry will appear in each issue of *The Pacific Dental Gazette*, and The Dental Summary.

We wish to make this department practical and useful. We will appreciate suggestions or constructive criticism. Send in any queries you wish. If you desire more detailed information concerning articles we will endeavor to supply it.

The membership of the committee is as follows:

Dr. John Albert Marshall, Chemistry, Histology Department and Pathology. University of California, Dental Department, San Francisco.

Dr. H. E. Gedge, Crown and Bridge Work. 141 Sixth Avenue., San Francisco, Calif.

Dr. W. S. Beach, Artificial Dentures, 516 Sutter Street, San Francisco.

Dr. George Hodges, Oral Surgery, Turlock, California.

Dr. Shirly Ashby, Preventive Dentistry, 209 Post Street, San Francisco.

Dr. R. A. Day, Orthodontia, 240 Stockton Street, San Francisco.

Dr. L. E. Carter, Radiography, 516 Sutter Street, San Francisco.

Dr. W. C. Wright, Dental Procelain, Union Square Bldg., San Francisco.

Dr. Chas. Zappettini, Root-Canal Technic, 1202 Union Street, San Francisco.

Dr. F. V. Simonton, Operative Dentistry and Chairman, University of California, Dental College, San Francisco.

DENTAL PATHOLOGY AND HISTOLOGY

By Dr. John A. Marshall

The published articles on dental pathology and histology which are being presented in the various journals, are so many in number that it is manifestly impossible to present simultaneously an adequate review of each one. In many cases the work reported in 1920 is directly connected, either experimentally or clinically, with the work reported in previous years. It has been thought best, therefore, to present at least one article which has been written in the current year, and one article written in the preceding year. By following this plan it will be possible to gradually accumulate reviews of work reported in this field of dentistry.

"A Further Statement Regarding a Plan to Compile and Publish Authentic Information and Authoritative Opinion on Problems Concerning Pulpless Teeth and Pulp Devitalization": (Elmer Best, Minneapolis, *Journal Dental Research*, Vol. 1, June, 1920). This article presents in detail the plan mentioned by the author in the December number of the *Journal of Dental Research* in which he proposes to compile data to be used for publication on the subject of "Pulpless Teeth and Pulp Devitalization." As a basis for this work, Dr. Best presents a list of fifty-four questions in which the treatment of deciduous and permanent teeth is very carefully covered. Although there are some questions involving facts in dental pathology about which our present knowledge is obscure, the thorough discussion of these mooted points will be of value.

Inquiry should be made from Dr. Elmer Best, 923 Metropolitan Bank Building, Minneapolis, Minnesota.

"Experimental Evidence Demonstrating the Influence of the Special Dietetic Factor on the Development of the Teeth and Jaws." By Mrs. May Mellanby, *Dental Record*, February 2, 1920, Vol. 40.

The author reports dietetical experiments conducted upon dogs, in which abnormalities in growth of bone and of teeth were obtained by maintaining a rigid diet.

The author indicates the relationship of dental defects to an abnormal diet, or, at least, to a diet in which the vitamines have either been excluded or else reduced to a minimum.

The author maintains that the vitamine designated Fat Soluble "A," "is one of the principal factors involved in the normal growth of jaws and teeth." The action of Fat Soluble "A" is reported to be concerned with the function of the ameloblasts.

Abstractor's note: Compare this work with that reported by Percy R. Howe on "Dental Caries," in *Dental Cosmos*, August, 1920, page 921.

"Vitamines," by W. Ramsden, *Dental Record*, May, 1920, Vol. 40.

An interesting article upon these accessory food factors in which the relationship between the vitamines and the deficiency diseases is traced. The tabular data presented indicate which type of food contains Fat Soluble "A," Water Soluble "B," and Water Soluble "C." This table is quoted from a report appearing in the Medical Research Committee, "Special Report Series" No. 38. The relationship of the growth of teeth to the diet of the child is emphasized.

"Some Affections of the Mouth," by James Harper, *Dental Record*, July, 1920, Vol. 40.

A comparison of the primary and secondary lesions of syphilis with those of malignant tumors. Reference is made to the local manifestations in the throat in diphtheria and scarlet fever.

"Studies on Elective Localization. Focal Infection with Special Reference to Oral Sepsis." By E. C. Rosenow, *Journal Dental Research*, Vol. 1, September, 1919.

A description of a series of well-formulated experiments upon the bacteria obtained from dental foci of infection. In discussing the inability of other observers to obtain evidence of the elective, localized power of these organisms, it is intimated that the proper attention to technical details was omitted. As an example of this, he mentions the fact that the bacteria concerned are extremely sensitive to oxygen and to different oxygen pressures.

In "Therapeutic Suggestions", based upon the findings of the paper, Rosenow states, "If a person who is perfectly well has harbored for some years one or more devitalized teeth in which the X-ray findings are negative, there would seem to be no good reason for extraction. If, on the other hand, the person is suffering from arthritis, a heart or kidney affection, or some other form of disease for which other causes can not be found, such teeth should be removed. Owing to the reparative power of the cementum, it would seem possible to devitalize teeth safely the pulps of which are sterile and the canals of which may be properly filled provided the operation is done in an aseptic manner."

ROOT-CANAL TECHNIC

By Dr. Chas. Zappettini

"The Teaching of the Technic of Cleaning, Curetting and Flling Root-Canals," (Edgar D. Coolidge, Chicago, *Journal National Dental Association*, April, 1918.)

Thorough root-canal technic is important. Data compiled by Dr. A. D. Black shows that of root-canal fillings classed as "good" from radiographs, only eight per cent. of cases were abscessed; while with root-canal fillings classed as "poor" sixty-five per cent. of cases were abscessed.

Sterilization and Asepsis—Sterilize instruments before operation; dip broaches in phenol and then alcohol constantly during use. Absorbent paper points should be used in canals instead of cotton. Spray mouth, paint gums and teeth with iodin; apply rubber dam; wash teeth with alcohol and paint with iodin again.

Access to Canals—Obtain free access to canals; cut away obstructing walls.

Filing and Curetting—If canal is small, use broaches with up and down motion; do not turn or twist for fear of breaking. If acid is necessary use only smooth broach; others are apt to break; neutralize acid with sodium bicarbonate. Always pass broach to apex then withdraw so canal is enlarged through entire length. Process of enlarging is continued by using larger broaches consecutively.

Measure Wires and Radiograph—Place diagnostic wires in canals; radiograph; sealing of tooth between sittings should be thorough.

Enlarging Canals—Canals should be enlarged so that a plugger No. 34 or Kerr No. 1 will pass to within three millimeters of the apex. Mark plugger to serve as guide in filling.

Dehydrating—Use alcohol, warm air and absorbent points.

Filling—Moisten canal with eucalyptol and chloro-percha. Cut gutta-percha cone three mm. Heat plugger and carry cone on tip into canal to end as indicated by mark on plugger. Pack carefully. Then other cones, two or three mm. long, are packed one by one until canal is full. Check up with final radiograph.

"What Constitutes Reinfection of Root-Canals and How Can it Be Prevented?" (Herman Prinz, Philadelphia, Pa., *Dental Cosmos*, Oct. 1919).

Section on "Technic of Filling Root-Canals" abstracted.

Dehydration of sterile root canal very important; infiltrate dentinal tubuli with very thin rosin solution, evaporate rosin solvent, coat varnished canal walls with thin film of gutta-percha paste, then plug solid with gutta-percha cone and cover pulp chamber with zinc oxychlorid cement.

(a) Dehydration. Use bibulous paper cones (not air blast), with heated metallic dryer. Apply acetone and repeat for safety.

(b) Infiltrate dental tubuli with thin rosin solution. (Rosin fifteen grains; acetone one-half ounce in well-stoppered bottle). Use cotton on broach, pump to place; solvent then dehydrated with warm air blast.

(c) Coat canal with gutta-percha paste. (One-half ounce of gutta-percha base-plate in small pieces placed in dry wide-mouth bottle and covered with one-half ounce of paraffin oil). The above mixture placed on heated sand bath until complete solution is obtained. When cool, has property of butter in cold wheather. Place quantity in canal with broach. Apply touch of warm air. Acts as lubricant to final filling and fills uneven nooks not reached by solid cone.

(d) Final filling of root-canals. Sectional points; use firm pressure to adapt semi-plastic gutta-percha points to place.

Occlude pulp chamber with oxychlorid of zinc cement.

"A practicable Root-Canal Technic," (Arthur B. Crane, Washington, D. C., *Dental Cosmos*, Dec. 1919, January, February and March, 1920).

Diagnosis: Writer advocates retention of minimum number of non-vital teeth and then only when these are necessary to preserve an unbroken arch or afford retention of prosthetic appliances. In either case teeth should come out unless they respond very favorably to treatment.

Accurate diagnosis based on methodical examination.

Root-Canal work contraindicated:

If—*First*, teeth with considerable dead apical cementum.
Second, teeth with considerable dead alveolar cementum.
Third, teeth with apical opening with maxillary sinus.

If false opening (laterally) is accessible it may be filled successfully.

Partly-filled canals—Until some method of telling if apical foramen is sealed by new growth of cementum; source of danger, no matter what periapical condition is.

Sterilization—Before opening canal. Sterilization of coronal dentin (ten per cent. beechwood creosote in oil of cloves, formocresol; Time—three or four days). (Howe's silver reduction; immediate).

Prepare tooth to place rubber dam.

Autoclave or high-pressure sterilizer for dressings. (Steam at fifteen pounds pressure, twenty minutes).

Boil instruments to be used twenty minutes.

Keep broaches in bottle of alcohol nine parts, oil of sweet almonds one part. (Will prevent rusting).

Dip gutta-percha points in iodin, allow to dry on glass slab, wash off with alcohol and place in alcohol bath.

Access and Broachings—Obtain free access; do not mar pulpal floor; have no overhanging pulpal walls.

Locate canals—fine smooth broach.

Removing of materials in canals:

Acids for inorganic material—sulphuric, hydrochloric and phenosulphonic.

Alkalies for organic material—sodium, potassium, sodium dioxid, sodium sydrovid.

Suitable solvents for previous fillings—xylol, chloroform, eugenol.

Enlarge canals—Kerr Files, Donaldson Barbed Broaches in graduated sizes.

Never twist file in canal. Enlarge on withdrawal of instrument. Wash out with hydrogen peroxid.

Cautions and Suggestions—Disinfectants, if pushed beyond apex, cause damage.

Howe's solution turns teeth black.

Organisms in root canal not highly resistant.

Dead dentin can be made innocuous only by sterilization and obliteration of root canal.

Canal and dentinal tubuli sterilized by use of sodium potassium alloy and thirty per cent. sulphuric acid, followed by mild antiseptic oils; or by Howe's silver reduction method.

The periapical region may be sterilized by electrolytic medication, followed by counterirritants such as iodin, mustard or capsicum.

(To be Continued)

EDITORIAL

THE STUDY CLUB

Are you a member of a study club? If not you should be. The study clubs that have been in existence for several years have been so beneficial to the members that the idea is being adopted by others, and study clubs are being formed in many sections throughout the United States.

The advancement of dentistry has brought many problems to be solved and our local and district society meetings have not furnished the material necessary to give much aid in their solution. Post-graduate courses conducted by state dental societies and others, have done more toward bringing the desired information, but the subjects have been limited and the courses of short duration. Many of the colleges are now giving practitioners' courses extending over a number of weeks' instruction, which are commendable but unfortunately comparatively few dentists are so located as to take advantage of such courses without a long absence from practice. So the study club is coming into popularity and classes formed and the work pursued at home without interfering with practice at all.

We are publishing in this issue an article written for THE SUMMARY by Dr. Max Fendler, St. Louis, entitled: "The Story of a Study Club." It is a history of the St. Louis Study Club, organized January, 1919. It tells of their plan of work, the subjects they have been studying, and other things of value to those contemplating the formation of such a club.

When the University of California G. V. Black Club was organized in 1913, the preamble of the constitution adopted read as follows: "We, the undersigned, hereby declare ourselves a club for the study and promulgation of the teachings of Dr. G. V. Black, and for the original investigation of the subjects included in the science and art of medicine, surgery, chemistry, dental surgery and collateral sciences. To elevate and sustain the professional character of dental surgeons; to stimulate them to the acquirement of scientific knowledge and to encourage among them a desire for original work and scientific research."

Commenting on this, Dr. F. V. Simonton, secretary, in a recent report says: "The aims expressed were, as a matter of fact, quite prophetic for they are more true of the policy of the club at this moment than they were when the club was organized. The club stands for better dentistry, for greater knowledge, for study and research. It hopes that its service to the profession has but commenced."

The formation of the study club is one of the greatest steps taken by members of the dental profession. Rightly conducted it is one of the best and most profitable organizations we have in the profession today, and we hope to see more and more clubs organized and a universal campaign started for greater dental knowledge and more advanced and better dentistry.

A SUCCESSFUL AUTHOR

Recently I received from my good friend Dr. Garrett Newkirk, Pasadena, Calif., an inscribed copy of his newest edition of "Lincoln Life Sketches" in verse and prose. This attractive little book contains twenty-one sketches in verse, covering the whole life of Lincoln, with explanatory notes and a series of classic extracts from his speeches and addresses.

It is a unique little volume of very creditable verse and unusual interest; a credit to both author and publisher and should be placed in every library, private and public. An admirable book for the office reception room table.

Any dentist ordering direct from Dr. Garrett Newkirk, 1505 Mar Vista, Pasadena, Calif., will receive an autographed copy. The price of the book is $1.25. The volume is published by Duffield & Company, New York.

Dr. Newkirk writes: "As small as is the volume it has cost me an almost incredible amount of labor, running through twenty-five years. The first 'sketch' was published with illustrations in the *Outlook*, February, 1899, the last one (21st) within a few months, 1920."

A new Lincoln story by Dr. Newkirk, appeared in the *Outlook*, February 9, 1921.

This author has several more books in preparation, one practically finished.

Dr. Newkirk, formerly one of the most prominent dentists of Chicago, moved to Pasadena a number of years ago and during his residence there has contributed extensively to general literature. Few dentists have entered the field of general literature and been successful.

NEW BOOKS RECEIVED

We desire to acknowledge receipt of an Index of the Periodical Dental Literature for the five years, 1911—1915. Compiled by Dr. A. D. Black.

The American Year Book of Anesthesia and Analgesia, 1917—1918.

Reviews will appear in a later issue of THE SUMMARY.

SUGGESTIONS

CONDUCTED BY F. R. CHAPMAN, M.S., D.D.S., COLUMBUS, OHIO

(To Our Readers: Give others the benefit of your practical suggestions by sending a description of them to Dr. F. R. Chapman, Schultz Building, Columbus, Ohio.)

To Etch a Gold Inlay

Place the inlay in mercury, the occlusal surface and margins first being protected by wax; wipe with cotton wool, then drive off the mercury in spirit lamp.—*Gordon C. Barkley, Commonwealth Dental Review.*

To Dissolve Modeling Compound

To dissolve modelling compound and leave the trays bright, boil them in a solution of borax and water. This is much better than sal soda.—*G. L. Watkins, Dental Digest.*

Pulp Extirpation

Where immediate extirpation is intended, if a pellet of cotton is placed over the rubber in the cavity, a much better pressure can be obtained as the cotton prevents the rubber from spreading so much under the instrument.—*W. A. B., in Oral Health.*

To Make Capsicum Plasters

Take a piece of blotting paper and thoroughly saturate with tincture of capsicum. When dry, paint one side with shellac, dissolved in alcohol. To use, moisten and apply to gum.—*Gordon C. Barkley, Commonwealth Dental Review.*

To Carry Cement

To carry a small amount of cement—as in a lining or a capping—to a rather inaccessible cavity, bend the end of a smooth broach into a small ring, and then carry the cement on this.—*Gordon C. Barkley, Commonwealth Dental Review.*

Suggestions

Vaseline your screw mandrels to keep them from rusting. It doesn't boil out easily.

Wax your instrument when conveying cement or protem. to the cavity. It lets go of the instrument easier.

When grinding teeth place a wet piece of tissue paper on the tongue. It catches most of the debris.—*H. B. Ward, Dental Register.*

NEW PUBLICATIONS

Block Anesthesia and Allied Subjects with special chapters on the Maxillary Sinus, the Tonsils, and Neuralgias of the Nervous Trigeminus. For Oral Surgeons, Dentists, Laryngologists, Rhinologists, Otologists and Students. By Arthur E. Smith, D.D.S., M.D., Oral Surgeon to Frances Willard Hospital and to House of Good Shepherd, Chicago, Ill. St. Louis; C. V. Mosby Company, Pub., 1920. Price net, $15.00.

The author of this splendid treatise says: "The principal object in writing this book is to give in a practical and utilizable form, the technic of block anesthesia and to include the important allied medical subjects which are so closely interwoven and the knowledge of which is so essential. This book has been written principally for oral surgeons, dentists and students, and an endeavor has been made to discuss the subjects and give the technic step by step in a definite and thorough manner.

As a special text-book it will be used by two classes of readers, one class consulting it for reference in connection with their cases; the other composed of practitioners and students who desire to familiarize themselves systematically with a knowledge of block anesthesia and allied subjects. There is no royal road to mastering technic, but if the student undertakes it in a proper and systematic way, it will be comparatively easy. The knowledge of block anesthesia and a knowledge of the allied subjects are essential. Therefore, in writing this text, allied medical subjects have been discussed. The technic for the various block injections is based upon anatomy and has been made as simple and practical as possible, being placed upon a scientific and accurate basis."

It is more comprehensive and complete than any book of the kind yet published and seems to leave little to be desired.

Dr. Smith's intensive study of the subject and his extensive experience in technic have fitted him eminently for the writing of this treatise. He has taken nothing for granted but has worked out to his satisfaction the methods and processes he advocates..

It is not a book for casual reading, although it would be interesting as such, but a work to be studied and its teachings followed day by day until one becomes himself proficient, not only in the technic, but in the knowledge of anatomy, physical diagnosis and everything that is essential to real success in block and other anesthesias. Every step seems to be illustrated, there being five hundred and ninety-five engravings distributed throughout the text.

It is complete in every detail and every dentist who reads and studies the text and makes a practical application of the knowledge gained, must become a more proficient operator.

The book contains 895 pages, is printed on extra quality paper and is typographically fine.

The author and publishers are to be congratulated on giving the dental profession such a useful and complete treatise.

Transactions of The Sixth International Dental Congress, held in London, August, 1914. Compiled and Edited by H. R. F. Brooks. Published by the Committee of Organization, Hanover Sqr., London, W.

The society proceedings here presented are of the meeting being held in London, just at the time war was declared, in August, 1914. No attempt was made to get the matter in book form until after the world war was over.

Even though several years since the papers were read at the International Congress, the book of proceedings, just received, is welcome for many of the papers are of special merit and the book forms a valuable addition to the library.

The volume contains 750 pages, is well printed and numerous engravings, some in colors, are used to elucidate the text.

SOCIETY·ANNOUNCEMENTS

Ohio Headquarters at Milwaukee

The Ohio Dental Club sent a representative to Milwaukee in September to look over the hotels and we have selected the Hotel Wisconsin as our Ohio Headquarters. We have reserved sixty rooms for one hundred people. These are being taken very fast.

If you intend to attend the meeting and wish to be with the Ohio dentists, make your wants known to the club officers at once.

The club will have a special train leaving Cincinnati, Saturday noon, August 13, arriving in Milwaukee Sunday morning.

E. L. PETTIBONE,
6503 Detroit Avenue, Cleveland, Ohio.

Michigan State

The next annual meeting of the Michigan State Dental Society will be held at the Hotel Statler, Detroit, April 11 to 16, 1921.

William H. Elliott, 7643 East Jefferson Avenue, Detroit, Michigan, chairman of the program committee; W. H. Waller, 613 Washington Arcade, Detroit, in charge of exhibits; W. A. Cook, 422 McKerchey Bldg., Detroit, in charge of hotel reservations.

CLAUDE S. LARNED, *Secretary*,
614 Post Bldg., Battle Creek, Mich.

Battle Creek, Mich.,
January 8, 1921.

Alumni Society of the Dewey School of Orthodontia

The next annual meeting of this society will be held on April 25 and 26, at the Hotel Ambassador, in Atlantic City. The usual high standard of the meetings of this society will be maintained. Clinics and evening sessions will be included in the program. All interested in orthodontia are cordially invited to attend these meetings.

GEORGE F. BURKE, *Secretary*,
741-43 David Whitney Bldg., Detroit, Mich.

Kentucky State Dental Association

The next annual meeting of the Kentucky State Dental Association will be held in Louisville, Ky., April 13, 14, 15, 1921; Seelbach Hotel as headquarters. A clinical program of unusual interest is being arranged.

Address all correspondence to, W. M. RANDALL, *Secretary*,
Louisville, Ky.

INDIANA STATE

CLAYPOOL HOTEL, INDIANAPOLIS
(*per usual*)

Four Great Days, May 16-19, 1921

MAY 16—AFTERNOON

"The Dental Hygienist," **ALFRED C. FONES**, D.D.S., Bridgeport, Conn.

Synopsis—How to put on an Oral Hygiene Campaign—Features to be included and avoided in a law—The use and advantages of a Hygienist in your office—Benefits to the profession.

EVENING—"Oral Hygiene," (illustrated) **ALFRED C. FONES**, D.D.S. Meeting open to the public.

Synopsis—Necessity of Oral Hygiene in our public schools—Conditions as they existed before and after an Oral Hygiene Campaign in Bridgeport—Illustrated by moving pictures.

MAY 17—MORNING

"Denture Prosthesis," **M. M. HOUSE**, D.D.S., Indianapolis, Ind.

Dr. House will deliver a lecture on some phase of the denture problem of interest to the average dentist.

"Gold Inlays," **R. H. VOLLAND**, Iowa City, Iowa.

Synopsis—Cavity preparation Illustrated with lantern and models.

AFTERNOON—"Diagnosis of Syphilis from a Dental Standpoint," **WM. F. KING**, M.D., of Indiana State Board of Health.

This lecture is illustrated, showing mouth lesions.

EVENING—"Gold Inlays," illustrated lecture, **ROSCOE H. VOLLAND**, Iowa City, Iowa.

Synopsis—Making of wax patterns—Investments—Dissipation of wax, dry and moist methods—Double Inlays—Metals.

MAY 18—MORNING

Those in attendance will be divided into four sections and Dr. Volland will give clinics to each section.

Synopsis—Investment mixing, applying, etc.—Oven and other methods of dissipating wax casting appliances—Rings, formers, sprues, machines and blowpipes—Actual casting of inlays—Exhibition of sample castings.

AFTERNOON—"The Relation of Malocclusion to Preventive Dentistry," **LANDIS M. WIRT**, D.D.S., South Bend, Ind.

Synopsis—Dr. Wirt will take up the orthodontist's viewpoint and responsibility of preventive dentistry.

"Periapical Bacteriology," **CARL D. LUCAS**, D.D.S., Indianapolis, Ind.

This is a continuation of the research work Dr. Lucas gave us last year on this important subject.

(Continued on page 359)

INDIANA STATE—Continued

EVENING—"The Care of the Gingivae in Preventive Dentistry,"
H. E. FRISELL, D.D.S., Pittsburgh, Pa.

Dr. Frisell is president of the National Association and there is no more capable man anywhere to present this important subject.

MAY 19

Seventy-five clinics covering all phases of Dentistry.

By all means arrange to attend this meeting. You cannot afford to miss this remarkable program. Reserve hotel accommodations early. Several other conventions are booked for this week, and that means crowded hotels.

EARL BROOKS,
Noblesville, Ind., Feb. 9, 1921. Ex. Commttee

Philadelphia Dental College—Alumni Society

The annual meeting of the Alumni Society of the Philadelphia Dental College will be held on Wednesday, April 20, 1921, at 9:00 A.M., in the College building, Eighteenth and Buttonwood streets, Philadelphia. All members of the Alumni should note the date and arrange to be present.

H. D. SHIELDS, *Pub. Com.*,
484 Roxborough Avenue, Phila, Pa.

Reunion of class of 1916, Tuesday, April 19, 1921. All out and as you were.

D. H. SIMMERMAN,
1010 W. Lehigh Avenue, Phila., Pa.

Pennsylvania State Dental Society

The fifty-third annual meeting of the Pennsylvania State Dental Society will be held in the Bellevue-Stratford Hotel, Philadelphia, Pa., May 3, 4, 5, 1921. An interesting and instructing program has been prepared. All ethical practitioners are invited to be present.

W. L. FICKES, *Secretary*,
East End Trust Bldg., Pittsburgh, Pa.

Massachusetts Dental Society

The fifty-seventh annual meeting will be held in Boston, Mass., at the Hotel Somerset, May 4, 5 and 6, 1921.

A cordial invitation is extended to all members of recognized dental societies.

W. VERNON RYDER, *Secretary*,
175 Newbury Street, Boston, Mass.

Tennessee State Dental Association

The fifty-fourth annual meeting of the Tennessee State Dental Association will be held at Nashville, May 17, 18, 19, 20, 1921.

J. J. VAUGHN, D.D.S., *Chairman Pub. Com.*,
Nashville, Tenn.

The Board of Dental Examiners of Alabama

The Board of Dental Examiners of Alabama will meet Monday, June 20, 1921, at nine o'clock A.M., at the Birmingham Dental College, Avenue F and 20th street, Birmingham, Alabama, for the purpose of examining applicants who hold diplomas from reputable dental colleges, for certificate of qualification to practice dentistry in Alabama.

All applications accompanied by the examination fee must be filed with the secretary-treasurer at least one week before the examination. For further information, application blanks, etc., address

H. CLAY HASSELL, *Secretary-Treasurer*,
616 22nd Avenue, Tuscaloosa, Alabama.

Iowa State Board

The Iowa State Board of Dental Examiners will meet for the purpose of examining candidates for a license to practice in Iowa, at Iowa City, College of Dentistry, beginning Monday, June 6th, 1921, at 9:00 A. M.

For further information and application blanks, address,

DR. C. B. MILLER, *Secretary*,
726 Fleming Bldg., Des Moines, Iowa.

Kansas State Board

The Kansas Board of Dental Examiners will meet a Wichita, Kansas, June 13th, beginning at 7:30 P. M. for the examination of applicants for license and the transaction of any other business that may come before the board. For application blanks and any other information, write, G. F. AMBROSE, *Secretary*,
111½ South Main St., Eldorado, Kansas.

The American Academy of Periodontology

The eighth annual meeting of the American Academy of Periodontology will be held at the Hotel Commodore, New York City, May 9 and 10, 1921.

J. HERBERT HOOD, *Secy.-Treas.*,
1101 Guardian Bldg., Cleveland, Ohio.

Illinois State Board

The 57th Annual Meeting of the Illinois State Dental Society will be held in Peoria, Illinois, May 10, 11 and 12, 1921.

The officers of the society are as follows:

President, J. P. Luthringer, 608 Jefferson Bldg., Peoria, Ill.; vice-president, C. W. Coltrin, 208 N. Mason Ave., Chicago, Ill.; president-elect, F. B. Noyes, Peoples Gas Bldg., Chicago, Ill.; secretary, Arthur G. Smith, 511 Central Nat'l. Bank Bldg., Peoria, Ill.; treasurer, T. L. Grisamore, 29 E. Madison St., Chicago, Ill.; librarian, G. H. Henderson, 340 N. Central Ave., Chicago, Ill.

Fraternally yours,
ARTHUR G. SMITH, *Secretary.*

Wisconsin State Board

The Wisconsin State Board of Dental Examiners will conduct a licensing examination at the Marquette Dental College, in Milwaukee, beginning Saturday, June 18, and continuing to Saturday, June 25, 1921.

The Wisconsin dental law provides that, "No person shall be examined by the board for a license to practice dentistry in this state, who shall not file with the secretary of the board, credentials proving to the satisfaction of the board, that he has a general education equivalent to that required for graduation from a high school or academy in the state of Wisconsin, having a four-year course beyond that of the eighth grade of the elementary school, and who is not a regular graduate of a reputable dental college or dental department of a university."

All credentials should be in the hands of the secretary of the board not later than June 5, 1921.

WILLIAM KETTLER, *Secretary,*
480 Berlin Arcade, Milwaukee, Wis.

Arkansas State

At Little Rock, May 16-21, 1921; post-graduate, under the instruction of Dr. A. E. Smith, Chicago—Oral Surgery and Conductive Anesthesia; Dr. Elbert E. Owen, St. Louis, Mo.—Full Denture Prosthesis; Dr. N. B. Nesbett, Boston—Partial Dentures and Removable Bridgework; G. E. Harter, Toledo, Ohio,—The Dentist and His Dollar. All meetings will be held at State Capital building, Little Rock. This is going to be a big meeting. Make your reservations now.

E. L. MILEY, *President.*
W. E. WILLIAMS, *Secretary-Treas.*

National Dental Association Meeting

Milwaukee, August 15 to 19, 1921, inclusive.

Milwaukee, metropolis of Wisconsin, famed from coast to coast for its homes, health, and hospitality, as well as for the fact that it is the greatest convention city in the middle west, will act as a great reception committee and hostess to the 8000 or more delegates, visitors, and guests, attending the twenty-fifth or Silver Anniversary Convention of the National Dental Association, on August 15 to 19, 1921.

Those who come to Milwaukee during the National Dental Convention are assured of a most interesting and entertaining visit, evidence of which is furnished in the fact that during 1920 the Badger Metropolis of nearly a half million persons played host and hostess to more than 200 convention bodies, ranging from county and state to national organizations.

Milwaukee's Auditorium, an ornate structure right in the heart of the city, erected at a cost of $1,500,000, will be the scene of the great gathering of representatives of the dental profession and its allied activities. The Auditorium, conceded without argument, to be the finest and most commodious, as well as the most conveniently arranged convention or exposition building in the world, covers an entire block within walking distance of the business district and hotels. The massive structure embraces within its expansiveness, six separate minor auditoriums under one roof, the smallest of which seats 300 persons, and the largest having accommodation for 10,000. Mechanics Hall, in the building in which the dental exhibit will be held, adds 46,000 square feet of floor space for exhibition purposes, making a total floor space for exhibits of 103,000 square feet.

Milwaukee's hotels, which have a national reputation for excellence and genuine hospitality, not forced by commercialism, but spontaneous because of the very nature of things, are making elaborate preparations to provide for the comfort, convenience, and pleasure of the thousands of guests who will register within their walls. With more than twenty hostelries of high standing, few cities are better equipped or capable of handling so many transients at one time. The respective houses are well ordered for entertaining the heavy business, tourist and convention traffic.

Management of the various hotels have already reported reservations for the convention in August, which is indicative of the fact that the entire country from coast to coast, and north to south, will have representation at the great Silver Anniversary gathering of one of the leading professions. The list of Milwaukee's leading hotels, the proprietors of which have given the convention committee full assurance of complete cooperation in providing for the thousands of visitors on August 15 to 19, are: Milwaukee Athletic Club, Mason and Broadway; Hotel Aberdeen, 909 Grand avenue; Hotel Blatz, East Water street, corner of

Oneida street; Hotel Carlton, Milwaukee street; Hotel Charlotte, 138 Third street; Hotel Gilpatrick, 223 Third street; Globe Hotel, corner Wisconsin and Cass streets; Hotel Juneau, 225 Wisconsin street; Hotel Marquette, 188 Wisconsin street; Hotel Maryland, 137 Fourth street; Hotel Martin, Wisconsin street; Hotel Medford, corner Third and Sycamore streets; Hotel Miller, Third street, near Grand avenue; Hotel Pfister, Wisconsin and Jefferson streets; Hotel Plankinton, West Water and Sycamore streets; Republican House, Third and Cedar streets; Hotel Randolph, 134 Third street; Schlitz Hotel, Grand avenue and third street; Hotel St. Charles, City Hall Square; Hotel Wisconsin, Third street, near Grand avenue.

Northern Ohio

At Cleveland, three big convention days, June 6, 7, 8; followed by three days post-graduate work on denture prosthetics, June 9, 10, 11.

Partial program, June 6, 7, 8:

Full Denture Construction—Dayton Dunbar Campbell.

Remember—That Dr. Campbell gives lectures and demonstrations before the entire convention each of the first three days. No extra fee for that. If you never heard him, you have a treat ahead of you.

Alveolar Process Resection—Carl D. Lucas.

Remember—That Carl Lucas has made a name for himself as an instructor as well as an oral surgeon.

Partial Restorations—Norman B. Nesbett.

Remember—Dr. Nesbett is the originator of the cast gold clasp. With twenty years' experience behind him, he will have some wonderful things to tell us.

The Root-Canal Problem of Today—Eduard M. Hall.

Remember—That Dr. Hall does clean-cut effective work wherever he goes. He knows what he has to say and says it.

Oral Diagnosis—Chalmers J. Lyons.

Remember—No need to tell Ohio people to remember Chalmers J. Lyons. They couldn't forget him or his work if they wanted to—which they by no means do.

Post-Graduate Course—June 9, 10, 11, under direction of Dr. Dayton Dunbar Campbell, Kansas City, Mo.

There is to be but one post-graduate course this year, but it will be the most thorough-going ever given before the Northern Ohio Association. With Dr. Dayton D. Campbell in charge, each member of the class will be expected to don laboratory apron, roll his up sleeves and actually do the work of casting a metal base, constructing occlusion model, taking the bite, mounting the case upon the articulator, and setting up a full upper and lower set of teeth. All materials and necessary equipment will be furnished by the demonstrator. Bring nothing with you except an open mind and your two good hands. An extra fee charged for this course.

This course was given by Dr. Campbell before five State Societies in 1920, and he is to repeat them before four of the five this year. If you haven't received a letter and application card, write Dr. J. V. Gentilly, Chairman, Ex. Com., 809 Schofield Bldg., Cleveland, Ohio, and ask for them at once.

Here is a half-day's work that will repay amply every dollar of expense and every moment of time—all free to members. Demonstrative Clinics on:

Tinker Construction of Crowns and Bridges,
Porcelan Technic,
Radiographic Technic and Demonstration,
Attachments for Partial Dentures and Saddle Construction,
Gold Inlay Technic,
Removable Bridgework,
Root-Canal Technic.

The clinicians have been carefully selected, and are men who have devoted much time and study to their chosen subjects. What's more, they are men who are able to impart their knowledge in a simple, comprehensible manner. A busy half-day; one very well worth your while.

Just a hint—Cleveland parks are likely to be chilly even in June. So make you hotel reservations *now*.

Idaho State

The second annual Post-Graduate Course of the Idaho State Dental Association will be held in Boise, June 27, 28, 29, 30, July 1, 2, inclusive.

Class instructors—Dr. D. D. Campbell—Full Denture Construction. Dr. Arthur E. Smith—Oral Surgery, Exodontia, Anesthesia.

Very truly,
L. G. PHILLIPS, *President*, Jerome, Idaho.
M. J. GOODE, *Secretary*, Filer, Idaho.

Dental Hygiene Society

A Los Angeles County Dental Hygienist Society has been organized. Mrs. Gertrude Buford has been elected president; Miss H. Cramer, vice-president; Miss Ethel McKinley, secretary and Mrs. C. Carter, treasurer.

Indiana State Board

The Indiana State Board of Dental Examiners will hold its next examination in Indianapolis, June 20 to 25. For application and instructions write to H. C. McKittrick, D.D.S., 1006 Odd Fellow Bldg., Indianapolis, Indiana.

H. C. MCKITTRICK, *Secy.-Treas.*

NEWS and OPINIONS

CONDUCTED BY G. E. HARTER

Germany tried to win the war by frightening the world by an exhibition of unspeakable barbarism entailing enormous loss of life. She lost. Now she is trying another bluff, this time threatening enormous loss of money, tending toward universal bankruptcy. Shall she win this time? Not if the rest of us keep our heads as we did prior to November 11, 1918. Germany can pay, and she should pay, the comparatively small reparation asked from her. Do not forget that the only right not forfeited by her is the right to ask for mercy.

Three state conventions during the same week make things just a trifle strenuous for those who find it necessary to attend all three of them—Indiana, May 16, Tennessee, May 17, Arkansas, May 16. Wouldn't it be well for executives to get together, at least by mail, and arrange convention dates a little more conveniently?

I was invited to visit the great First District Society of Detroit, on March 10, and address the members on "The Dentist and His Dollar." The invitation was accepted with pleasure; and, if the members derived as much profit as did the writer, the evening certainly was well spent. The memory of the courtesies shown and the entire visit will long remain as a green spot to be contemplated with pleasure. The First District people certainly know how to conduct a meeting. I am especially indebted to Drs. Lane, Elliott and Lowery for courtesies extended.

A truce has been declared in the fight between the ethical and advertising dentists of Washingston state, and an agreement reached upon a new law regulating the practice of dentistry is to be introduced and passed without opposition. The new law will forbid the advertising of cures of irreducible diseases, etc. Aside from that, it looks like a victory for the non-ethics. A law licensing the dental hygienist also is pending. Ditto in Oregon.

Keep a tight hold on your surplus cash just now. Avoid speculation, but keep a sharp lookout for first-class investments. I have been asked about railroad stocks. They may be a good buy, but I am not putting any money into them myself. The future of all railroads is more or less in doubt. Better wait, even if you must pay a little more later. Government bonds at the market and good municipals are about the best "waiting investment" as I see it.

I doubt if good real estate in larger cities is due for much of a decline from present prices. If you want to buy a home, find the place that suits you, get best price the owner will make, and then make an offer. If reasonable your offer is likely to be accepted. This is a "buyer's market."

Members of St. Joseph County, Ind., Dental Society have taken over the care of the teeth at the Orphan's Home without charge. The society also adopted a resolution asking the state senate and the state board of education to permit the State Dental Society to endorse certain chapters dealing with diseases and care of the mouth to be inserted in the new physiology which will be used in the public schools, the result of legislative decision to change text-books.

An alleged dentist, "Dr." Edward Edwards, has reached the end of a "checkered" career at Buffalo, N. Y., where he has received a one-year sentence for passing worthless checks. His plan was to travel about the country in a high-powered Stutz, wearing a $600 fur overcoat, buy everything and anything that was for sale, pay for it by check for more than the amount, pocket the change and clear out. It is alleged that he admitted to the police that he had passed 175 of his bogus checks since December 1. Moral: Do no business with strangers involving any risk; cash no checks; do not accept checks in payment for services from those not known to you; do not "give change" for checks larger than your bill. Better to be safe than sorry.

Do all you can to stabilize conditions, now more chaotic than at any time, possibly, in the history of the country. You can do much by talking law and order, the necessity for ethics within and without the profession, and the necessity that everybody should bear and forbear until conditions be brought back to normal. Remember always that nothing ever "just happens." Conditions are precisely and only such as men have made them by their every-day living, and only by correct living can they be improved. It is for us to say under just what conditions we care to live; then go to work to bring about those conditions.

Dr. A. E. Mann, Findlay, Ohio, has been elected grand warden of the grand lodge I. O. O. F. He will prove an able man for the position.

Mrs. Richard Blum, divorced wife of a New York dentist, has sued George J. Gould for a half million, alleging that he insisted upon a divorce in order that she might marry him, and now refuses to carry out his part of the compact. There's lots of trouble in this man's old world.

Golds and Fluxes

SCIENTIFICALLY prepared golds require scientifically prepared fluxes.

Ordinary borax and most of the empirical preparations offered the profession have proved inadequate.

THE NEY SERIES OF FLUXES

(Weinstein Formulae)

provides the right flux for each casting and soldering requirement. These operations are thus made easier of accomplishment and the results are all that careful work anticipates.

NEY'S SOLDERING FLUX, REDUCING FLUX, AND OXIDIZING FLUX

Literature sent on request

IF YOUR DEALER CANNOT SUPPLY ANY ARTICLE OF OUR MANUFACTURE, WRITE TO US

THE PIONEER
THE LATE
JOHN M. NEY

The J. M. NEY COMPANY
FOUNDED IN 1812
President
HARTFORD CONNECTICUT, U.S.A.

NEW GOLD FOR
PRECIOUS METAL PRODUCTS
OLD GOLD, SILVER
PLATINUM ETC.

As nearly as I have been able to learn, only about twenty per cent. of dental patients keep their promises as to appointments, home care of the teeth, and payment of dental bills. So, there seems no likelihood that the demand for dentistry ever may grow less, or that the time when dentists can afford to be careless about collections ever can arrive. However, every dentist can improve his collection methods, and should do so; and the time to begin is at the chair during the first sitting, during which it is possible to impress upon the patient the benefit arising from correct dental treatment, and the loss of health sure to follow its neglect. Talk health, not dental operations.

Here are some figures from Seattle: Women of that city spent last year ten million dollars for millinery, ready-to wear garments, tailored suits, etc. They spent $100.000 with hairdressers, manicurists, etc. The dental bill of the city last year was $750.000.

Dr. James Blaine Monroe, formerly a Ft. Wayne, Ind., dentist, is in deep water on account of an acquired habit, it is alleged, of too intimate acquaintance with a hypodermic, and the consequent passing of worthless checks upon friends and acquaintances. At last accounts he was awaiting trial in the Allen county jail. It is said that some of the Doctor's friends cashed his checks knowing them to be worthless, expecting that, when trouble came, his relatives would make good. Better not take such chances unless you have money to burn. It may be fun, but it's mighty poor business.

Illinois legislature is considering a bill to bar "quack" dentists from practice in that state. Now, just what and who is a "quack?" Replies will be filed in the order of their receipt.

Ten years ago it was just about impossible to get a word into the lay press concerning dentistry unless paid for "at regular rates." Today, two clipping service bureaus are sending in just about a half bushel of clippings every month. The doings of dentists are now quite as much a matter of news as are those of society leaders, to say nothing of M.D.'s, etc. So much for keeping constantly prodding away.

Free clinics are now as common as schoolhouses—almost; and boards of education no longer shy at appropriations for their support. It is one of the most gratifying events in my life to realize occasionally that I had something to do with bringing about this state of affairs.

Dr. P. L. Austin, Seattle, has been found guilty of grand larceny in superior court for having induced an innocent party to invest a large sum of money in a rubber concern at a time when he, Austin, is said to have known the concern to be insolvent. Dr. Austin may have been himself a victim; but it is just as well to be a little careful how you endorse a concern of which you know little. Gamble, if you like; but be prepared to take your losses like a little man.

Dr. Harvey J. Burkhart, director Rochester Dispensary, is planning to visit the dental colleges and schools of England, France, Belgium, Spain and other European countries, for the purpose of studying their methods and applying all that he finds good in the education of dentists in the new Rochester University. He will attend the meeting of the International Dental Federation, at Madrid, about the middle of April.

Because of a little matter of a deficit of only $27,000,000 in the Greater New York school fund, Mayor Hylan has vetoed the ordinance establishing dental clinics in all the city schools. Both the Mayor and the Commissioner of education favor the measure, but do not feel that the money can now be spared.

Harvard has raised dental tuition fee to $200 per year.

A patient while recovering from the effects of gas anesthesia, leaped to his death through a third-story window. Widow is suing for $50,000, alleging that proper care was not taken to avoid accidents. Just as well to remember that patients are not immediately in possession of all their faculties under such conditions, and take care that they are protected. Some few years ago a dentist was killed by such a patient.

Good reports are coming from the Muncie, Ind., school clinic. Dr. J. H. Lindley is in charge.

Duluth, Minn., dental examiners, found one perfect set of teeth in the mouths of each 200 pupils in public schools; one-half of one per cent., you will notice. Plenty of work for the dentist up there.

Dr. Walter W. Gochenour, of Lafayette, Ind., has moved to Delphi and taken up the practice of his father, the late Dr. Harrison Gochenour. The young man served two years in the World War. was promoted to the rank of Major, and has been practicing at Lafayette since his return.

Under the direction of Dr. Fred Henshaw, dean of the Indiana Dental College, the 325 children at the Indiana school for the deaf will be given dental service once each week by the senior class of the college. The war department has been asked to trun over equipment now unused. This is good work. The first examination disclosed the fact that seventy-five per cent. of the children now need dental attention.

A dentist at Vancouver has brought suit to recover Victory bonds to the value of $2,300 obtained from him in a manner alleged to be illegal. It is far easier to keep what you have than to recover that which is taken from you by sharp practices of any kind. I know nothing about the merits of this particular case; but I do know that nobody ever took from me bonds or other securities upon any pretext whatever. Savings are too hard to get together to be carelessly dissipated.

Grandpa was right -

They were "false teeth"

False—not because they were *"store teeth"* (as he also used to call them) but because they failed *miserably* to take the place of the teeth he'd lost.

THOUSANDS of dentists of today have grasped the fact that dentures must be *"restorations* that *restore"* not only function but appearance.

Fancy selecting teeth without character or form for a face of such individuality as here shown. All the appearance of strength would be lost—the effect would be pitiable.

Americans exact better service and pay more for it than do the people of any other nation. If anything is better, they need only be shown.

When shown Trubyte Teeth no one can be "resigned" to "false teeth." In the past there was some excuse, but today the dentist who has not grasped the Trubyte Idea is standing in his own light.

Trubyte

—the Teeth of Character

Thousands of discerning men and women live in fine homes, ride in cars of quality, wear clothes of exclusive weave and pay millions in luxury taxes. This proves that they prefer and pay for articles of the better sort.

Do you believe for a moment that anyone prefers "false teeth?" If you will give your patients an opportunity to compare Trubyte Teeth, which embody the principles of harmony of tooth form with face form, with the old conventional teeth, you may depend upon their choosing Trubyte, "*the teeth of character.*"

The Trubyte Idea enables you to confer a benefit of great importance on your denture patients, and a *corresponding* benefit on yourself. Need we say more?

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"Facts, Fads and Fancies about Teeth," by Dr. H. L. Ambler.

This is the *only* dental book of wit and humor, and some *history;* a never ending fund of anecdote, never out of date; contains a poem by Dr. Bethel, editor of THE DENTAL SUMMARY. We have a few left, original price $2.50, our price, $1.50.

By the same author, "History of Dentistry in Cleveland, Ohio," $1.50. "Tin Foil and its Combinations for Filling Teeth," $1.25.

"Around the World Dentistry," $1.25.

"Partial History of Northern Ohio Dental Association (1857)," $1.00.

For sale by The Ransom & Randolph Co. Postage prepaid.

In 1630, nine hundred English came to America in eleven ships, and after a voyage of about six weeks, landed on the shore and named the place Boston; the above year was a memorable one, because it brought us our *first* dentist; for *full* particulars see "Early Dentistry in America," by H. L. Ambler, in THE DENTAL SUMMARY, October and November, 1909.

The Fourth Division of Australian Dental Association has adopted as their official organ what is known as the Australian Edition of THE DENTAL SUMMARY, a magazine published by The Ransom & Randolph Company, of Toledo, Ohio, U. S. A.—*The Dental Science Journal of Australia.*

Brothers, Dentists, Killed in Automobile Accident

Wallingford, Conn., March 14—Dr. E. B. Sullivan, of Wallingford, and Dr. John Sullivan, of Willimantic, dentists and brothers, were killed in East Center Street here last night when the automobile in which they were riding went over an embankment. They were found dead under the machine. The cause of the accident is unknown. Dr. John Sullivan came yesterday to visit his brother and they spent most of the day motoring. Dr. E. B. Sullivan was forty-two years old and unmarried. His brother was a little older and leaves a widow and daughter.

Ohio—Miami Valley

Dayton, Ohio, March 8.—The Miami Valley Dental Society, at its next meeting, will probably discuss the change in the state government as it affects dentists.

Physicians and druggists have gone on record as opposing the plan of Governor Harry Davis, by which, they claim, their state boards will be given a political aspect.

The dental society, meeting Monday night at the Elks' club, elected officers as follows: F. W. Cockerill, president; J. H. Warner, president-elect; W. B. McBain, recording secretary; E. S. Fuller, corresponding secretary, and L. J. Deger, treasurer.

R. M. Cope gave a talk on the use of anesthetics, after which A. J. Lewis, C. B. Tizzard, of Dayton, and H. Mills, of Middletown, conducted the discussion.

You get paid for the **results** *you get*

—not merely for radiographs. Make your results good diagnostic pictures every time.

Proper Penetration, Proper Angles and Distance, Proper Time of Exposure.

Every perfect radiograph must be based on these features.

They must be controlled otherwise you are guessing.

The design and construction of the Adams with the use of the Adams film holder controls every one of these factors.

You won't need a special room—the Adams won't be in the way—it will always be available for instant use. Use it with your chair, a stool, or with the patient standing. It occupies only a 20-inch square of floor space.

Every Exposure Counts.

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Begin and Win!

Lose this day loitering, 'twill be the same story
Tomorrow, and the next, more dilatory;
Each indecision brings its own delays,
And days are lost lamenting over days.
Are you in earnest? Seize the very minute!
What you can do, or think you can, begin it!
Action has genius, courage, and magic in it;
Only begin it, and the task grows easy;
Begin it; and the task will be completed.
—*Goethe.*

One little corner of the world
Is mine to live in and make bright.
Although it may seem small to you
It's quite a job to fill it right.
—*R. McCann.*

Man of Few Words—"What did Hogan say when Kelly called him a liar?"

"Nothin' much."

"That's funny. Hogan used to be a hot-tempered guy."

"Well, he never said a word except, 'Have ye had enough yet?'"—*The American Legion Weekly.*

DEATHS

At Atlanta, Ga., February 8, Dr. William Crenshaw, one of the founders of the Atlanta Dental College, and dean of that institution until its consolidation with the Southern in 1917, aged 74.

At Springfield, Mass., February 18, Dr. Newton Morgan, aged 81.

At Albany, N. Y., January 23, Dr. R. G. Sterrill, aged 38.

At Ashville, N. C., February 1, Dr. George A. Cullum, of Livingston, Tenn.

At his home in Canada, February 20, Dr. George S. Parker, aged 79. He was the founder of the practice now conducted by his son widely known as "Painless Parker."

At Anna, Illinois, February 11, Dr. Charles H. Shafer, aged 64.

At Quincy, Massachusetts, February 22, Dr. Paul E. Held, aged 31.

At Hoquiam, Washington, February 10, Dr. Guy Penepacker, aged 37.

At Aiken, S. C., February 28. Dr. B. Hammett Teague, commander of United Confederate veterans, aged 75. Dr. Teague was a good friend of The Dental Summary, although he at times objected to some of the ideas expressed in these pages as being "too much Yank." The South had no more loyal son.

At Jackson, Mississippi, February 28, Dr. E. T. Wade, 69, as the result of being struck by an automobile.

At Forest City, Maryland, February 14, Dr. J. H. Gettys, aged 45.

At Seneca, Illinois, March 8, Dr. Richard D. Moran, aged 55.

At Montesano, Washington, March 1, Dr. G. H. Wartman, aged 58.

At Houma, Louisiana, March 5, Dr. Rudolph L. Zalenka, president State Board of Examiners, aged 53.

At Aberdeen, S. D., March 5, Dr. Joseph S. Goodmanson, 52.

At Providence, Rhode Island, March 7, Dr. Nelson B. Whittaker, aged 86, the oldest dentist in years and in practice in the state.

At Brooklyn, N. Y., March 7, Dr. W. Spencer Taylor, 77, retired. Dr. Taylor was formerly the head of the Brooklyn Dental Supply Co., having retired from practice some years since.

At New Castle, Pa., March 8, Dr. Wellington C. Miller, aged 60, retired.

At Adrian, Mich., March 11, Dr. Forrest H. Kurtz, of pneumonia, aged 29.

At Laurens, S. C , March 12, Dr. George C. Albright, aged 51.

At Plainfield, N. J., March 14, Dr. Frank S. Mills, aged 78.

At Titusville, Pa., March 15, Dr. Herbert S. Orwig, of Wilkinsburg.

DR. CHARLES W. WILSON

On Sunday, March 5, 1921, after a long and painful illness, at his home, 2432 Broadway, Toledo, Ohio. Dr. Charles W. Wilson, one of the best-known of our Toledo dentists, aged 51. He had practiced in Toledo for more than 25 years.

Dr. Wilson was born at Centralia, Ill., graduated from the Cincinnati College, and began practice here.

Dr. Wilson leaves a widow and two children, a son aged seven, and a daughter aged three. Funeral was conducted by Rubicon Lodge, F. & A. M. of which he was a member.

Classified Advertisements under this heading, $2.00 each for 60 words or less; additional space, 2 cents per word, single insertion; three insertions or more, special rate on application.

OPERATOR registered in Ohio, with seven years' experience, desires position in a city of 10,000 or over. Graduate of Ohio College at Cincinnati. Good all-around operator. I am 30 years of age, and married. Will not consider less than $75.00 a week to start. Can furnish best of references Address 410-C, care of The Dental Summary.

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Ohio—Central

Marion, O., February 25.—John Pfannstiel, of Delaware, was elected president of the Central Ohio Dental Society today at its tenth annual meeting.

The other officers chosen were: R. C. Bratton, Galion, first vice-president; Z. B. Houghton, Marion, second vice-president; L. T. McKinney, Richwood, recording secretary; May Mills, Delawere, corresponding secretary, and F. C. McGaughy, Galion, treasurer.

The district of the Central Ohio Society includes Wyandot, Hardin, Union, Delaware, Morrow, Crawford and Marion counties.

This afternoon the speakers were, J. P. Henahan, of Cleveland, and F. C. Starr, of Columbus. Dr. Henahan dealt with "Oral Surgery and Impactions," and Dr. Starr had for his subject, "Crown and Bridge and Cast Gold Clasps."

Ohio—Northeast

The new officers of the Northeastern Ohio Dental Society, which recently met in Ashtabula, are: President, O. T. Battles, of Jefferson; R. J. Goggin, Ashtabula, vice-president; N. S. Christian, Geneva, secretary and treasurer.

Indiana—Huntington County

Huntington, Ind., February 3.—The fourteen dentists in Huntington county have formed a dental association and will hold meetings once a month, in Huntington county.

The officers elected at a special meeting are: President, W. F. Danielson; vice-president, P. E. Monroe; treasurer, O. P. Muckley; secretary, Mark H. Shideler.

Indiana—Western

Terre Haute, Ind., March 9.—A. A. Spears, of Brazil, was elected president of the Western Indiana Dental Society, at the annual meeting of the society this morning. E. E. Hoffa was elected vice-president, and Noble R. Fox and L. E. Trinkle were re-elected secretary and treasurer, respectively. J. W. McHatton, of Rockville, was elected trustee for the local society, a component of the State Association.

More than fifty members and visitors registered this morning. The meeting was called to order at nine o'clock by former president George Marbach, and the reports of the various committees read. The remainder of the forenoon was spent discussing the exhibitors' clinics.

A. R. Ross, of Lafayette, Ind., spoke in the afternoon on legislation. L. F. Smith, of Indianapolis read an interesting paper on, "The Dental Assistant." Arthur C. Engle, of St. Louis, was the principle speaker of the day. His address was on "Alveolectomies and Surgical Removals."

Indiana—Thirteenth District

Elkhart, Ind., January 18.—Fifty members of the Thirteenth District Dental Society, at the annual meeting here elected the following officers: President, W. O. Valette, of Goshen; vice-president, George F. Hitchcock, of Plymouth; secretary, Von L. Kennedy, of Elkhart, and treasurer, C. L. George, also of this city.

Kansas City Psi Omega

Kansas City, March 8.—At a meeting of the Kansas City chapter of the Psi Omega dental fraternity, Monday night, at the Hotel Baltimore, the following officers for the ensuing year were elected: Grand master, H. Horton Helzberg; junior master, W. L. Cronkite; treasurer, H. R. Davis; secretary, George E. Halley.

Texas—State

Dallas, Texas, March 6.—With the election Saturday of W. D. McCarty, of San Antonio as president of the Texas State Dental Society, and the filling of other offices, the forty-first annual convention of the society closed after being in session in Dallas for three days.

Prior to adjournment the convention voted unanimously to accept an invitation from Houston, to meet there next year.

Other officers elected: W. H. Scherer, Houston, first vice-president; A. L. Frew, second vice-president, Dallas; member of executive committee, E. L. Williams of, Houston; chairman of clinic committee, J. F. Clark, of Beaumont; member of dental board, H. W. Hoffer, of Kaufman.

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Louisiana—First and Second Districts

New Orleans, La.—George J. Mire was elected president of the First and Second District Dental Society, at the annual meeting. Other officers chosen are: Vice-president, A. B. C. Meynier; secretary, Henry L. Bowman; treasurer, George E. Sandoz; chairman executive committee, Leo Delpsey.

Pacific Orthodontists

Portland, Ore., Febuary 17.—Charles C. Mann, of Seattle was elected president of the Pacific Coast Society of Orthodontists at the annual meeting here today. Carl O. Engstrom, of Sacramento, Calif., was elected secretary and treasurer.

Southern Society of Orthodontists

Dallas, Texas, March 11.—Dentists from all sections of the state, who are attending the post-graduate course now in session at Baylor University Dental Department, under the auspices of the Texas State Dental Society, have organized the Southern Society of Orthodontists. Officers elected for the new organization, which includes, Texas, Louisiana, Oklahoma and Arkansas, are T. O. Gorman, San Antonio, president; W. E. Flescher, Oklahoma City, vice-president; P. G. Spencer, Waco, secretary-treasurer. The board of directors is composed of T. W. Sorrels, Oklahoma City, T. G. Duckworth, San Antonio, and Oscar Busby, of Dallas.

National at Milwaukee

Milwaukee, Wis.—Dr. C. W. Hall, general chairman, will have charge of arrangements for the silver anniversary convention of the National Dental Association, to be held in the Auditorium, August 15 to 19.

Other chairmen are: Adolph Gropper, clinic; Wiliam H. Cudworth, illustrated clinics; Edwin A. Flancher, exhibits; Harry L. Banzhaf, halls and hotels; Harry G. Morton, publicity; Otto G. Krause, entertainment.

Governor Davis has appointed Clarence H. Burmeister, of Cincinnati, member of the State Board of Dental Examiners. The appointment filled a vacancy due to the expiration of a term of one of the board of five examiners.

A Hint for Tired Dentists

FINDS BIG PROFIT IN CHICKENS

Dr. W. B. Dormon, of Nashville, Tenn., is one of the best known dentists in Tennessee, and formerly was president of the Arkansas State Dental Association. Farming is his hobby, and he is one of the best known breeders of pure-bred cattle and Duroc Jersey hogs in the state. Naturally he has to have a foreman on his farm and to make things interesting for the foreman's wife the doctor has made an agreement concerning the raising of chickens.

He furnished a flock of pure-bred White Leghorn chickens. The fowls get all the feed they will eat from what otherwise would be wasted around the barn, sheds, troughs and pastures of the hogs. The foreman's wife takes care of the flock and she and the doctor divide evenly the chickens and eggs produced.

"The original cost of the chickens and the buildings was $88, and the sales of eggs and fowls for a year has been more than $600, more than $300 apiece," says Mr. Cottrell. "The start was made by buying 250 day-old chicks from a good breeder. When the chicks reached broiler size, the cockerels and pullets that did not promise well were sold for $66.80. Seventy pullets were saved for layers. These pullets began to lay when they were six months old and in the first two laying months they produced eggs enough to pay all expenditures up to that time. Eggs were sold for hatching and some of the choice cockerels were sold for breeders. Gross returns for the year were slightly more than $8.50 per hen.

For the Lay Press

CUT THIS OUT AND HAVE IT PRINTED IN YOUR LOCAL PAPER

Goiter

In speaking of the diseases and infections of the body that arise from the teeth, it is not intended to give the impression that the teeth are invariably the cause of infection, but these cases are explained in order to show the results of neglecting mouths.

Until recent years we had not realized the danger of neglecting the mouth and teeth—because digestion was so seriously interfered with, by the inability to chew, and because appearance and distinct speech were ruined, and because pain of many kinds and of great intensity was a very frequent occurrence, and because broken roots and open cavities retained decomposing food and mucus, with a resulting bad breath. These were a few of the things that caused the more cultured people to have their mouths put in order.

The researches of the great institutions that are devoted to the study of disease have shown us that the results of neglected mouths are far more serious than we had at first believed; and there is just one way to avoid these serious results. That is to take care of the mouth in time.

Begin with the children, and if the child is trained to have its mouth in good condition and to know the comforts that follow a good mouth condition, the child will make very strenuous efforts, in later life, to have those same physical comforts.

One of the most embarrassing as well as serious of the widespread diseases of this country—a condition that is becoming more and more frequent—is goiter, which is the enlargement of the thyriod gland which lies in the interior portion of the neck.

A swelling of this gland produces a very unsightly enlargement of the neck, many times causing a series of what is known as thyroidism.

Thyroidism is attended with sleeplessness (or insomnia), nervousness and excitability, twitching and rapid heart action.

It was found that in large numbers of goiters the infection in the thyroid gland was a certain bacteria that is found in abscess sacs at the ends of roots of diseased teeth in the mouth of the patient; and in many instances the treatment of the teeth, or the extraction of the teeth and curetting of the sockets, relieved the goiter entirely.

It is therefore advisable to have a careful X-ray examination of the mouth in all goiter cases.

The Omicron Kappa Upsilon Honor Fraternity met in Indianapolis in January during the meeting of the American Institute of Dental Teachers. Supreme officers elected are: Dr. Arthur D. Black, president; Dr. H. E. Friesell, vice-president; Dr. J. H. Phillips, Secretary-Treasure.

Coming Events

April

Alabama, at Montgomery, (12, 13, 14),
Connecticut, at Waterbury, (19, 20, 21).
Kentucky, at Louisville, (13, 14, 15).
Michigan, at Detroit, (11-16).
Wissouri, at Springfield, (25, 26, 27).
Mest Virginia, at Bluefield, (11, 12, 13).
Philadelphia Alumni at College Building, Philadelphia, (20).
Atlantic City Alumni of Dewey School of Orthodontia, Hotel Ambassador, Atlantic City, (25, 26).

May

Arkansas, at Little Rock, (16-20).
Illinois, at Peoria, (10, 11, 12).
Indiana, at Indianapolis, (16, 17, 18, 19).
Iowa, at Des Moines, (3, 4, 5).
Massachusetts, at Boston, (4, 5, 6).
Nebraska, at Omaha, (no date given).
New York, at New York City, (11, 12, 13, 14).
North Dakota, at Minot, (no date given).
Pennsylvania, at Philadelphia, (3, 4, 5).
Tennessee, at Nashville, (17, 18, 19, 20).

June

California, at San Francisco, (27 to July 2).
California, (Southern) at Los Angeles, (no date given).
Florida, at Gainesville, (no date given).
Georgia, at Macon, (8, 9, 10).
Maine, at Bar Harbor, (21, 22, 23).
Maryland, at Baltimore, (no date given).
New Mexico, at Albuquerque, (no date given).
North Carolina, at Charlotte, (no date given).
Ohio, (Northern) at Hotel Statler, Cleveland, entire week, (6-10).
South Carolina, at Greenville, (no date given).
Utah, at Salt Lake City, (no date given).

July

Washington, at Vancouver, B. C.
Wisconsin, (12, 13, 14).

In the Chair

I felt his soft breath on my cheek
And the gentle touch of his hand—
His very presence near me
Seemed a breeze on the desert sand.
He deftly sought my lips
My head he did enfold,
Then he broke the silence with,
"Shall the filling be silver or gold?"

—*Iowa Frivol.*

Difficult Case

"I'm up against it," said the doctor. "I have a patient suffering from aches and pains and I don't know what's causing the trouble."

"Had his teeth examined?"

"That's the difficulty. I had all his teeth extracted two years ago. I've cured many a man by having a tooth or two pulled, but what are you going to do for him when he's run out of teeth?"

The ass is noted for his braying, the mule for his kicking. Don't ape either.

You should buy only one

Dental X-Ray Outfit

in a lifetime and before doing so

SEE

EDWARDS Coolidge Dental X-Ray Unit.
EDWARDS Mobile Tube Holder (at your finger tips.
EDWARDS Gravity Time Switch.
EDWARDS Auto Control.
EDWARDS Angle Indicator.
EDWARDS Cathode Protection.
EDWARDS Face Form Funnel (constant film to target distance.)
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REGULAR CONTRIBUTIONS

THE DENTAL SUMMARY
THE MAGAZINE THAT HELPS
Vol. XLI May 1921 No. 5

CAST CONSTRUCTION FOR ARTIFICIAL DENTURES*

BY I. LESTER FURNAS, D.D.S., CLEVELAND, OHIO

I DID NOT CHOOSE THIS SUBJECT because the cast or the technic of its construction is the most important step in artificial denture work, for, as I see it, there is no one step that is all-important or stands out in prominence above all others. It is the old story of a chain being no stronger than its weakest link; but I choose it for two main reasons:

First, because I believe a large percentage of the failures in full denture work are due to improperly-constructed casts and the abuse of properly-constructed casts.

Second, because the technic of construction is such that the average dentist without effort or intention, is very likely to slight certain steps which will render an otherwise perfectly good cast almost useless.

It is not within my province in this short paper to discuss any of the merits or demerits of the many different methods of impression-taking; but, in passing this subject, let me say that the advent of the muscle-trimmed impression, whether it be of plaster of Paris or modelling compound, has brought with it a marked change in our cast construction.

What has been the principal cause, then, for failure as regards the cast?

Paramount among these reasons I should say was the inability of the materials used in its construction to withstand the forces of compression to which the average cast is generally subjected.

The manufacturer of the various cast materials has sacrificed compression in order to overcome expansion and contraction.

Next in importance I should say, should be placed the fact that the average dentist does not possess a thorough knowledge of his cast materials, or if he possesses it, does not exercise it.

How many of you gentlemen here know just what you are using for your casts?

---

*Read before the Ohio State Dental Society, December, 1920.

What constitutes a scientific mix?

What tests have you made upon it for compression?

When is its compression greatest, before or after the sweating stage?

What is its working period?

What do you know about its expansion and contraction?

What pressure do you apply to the face of your cast during the closing of your flask?

To what extent does your cast disintegrate during the process of vulcanization?

At what temperature does this disintegration take place?

Is it before or after the flow of rubber in the flask has stopped?

I ask you these few questions in all seriousness; and then will you not agree with me that so important a thing as our cast, over which we are to fashion our dentures for adaptation, and constructed of materials so fallible, should receive more serious consideration than most of us have given it in the past?

It will not be practicable nor possible for me to attempt to give you here a lengthy review of all cast materials. They all have their advantages and disadvantages. There is no one material that can be considered as ideal.

Having it understood then, that I am not recommending over and above all others any particular manufacturers' product, may I not outline a technic that I believe to be highly commendable, using for my cast the material known as Spence Plaster Compound?

Spence Plaster Compound when properly mixed has a crushing resistance of 1000 pounds per square inch, 24 hours after mixing, and 1800 pounds per square inch, 12 hours after mixing. Notice, please, that there is a difference of about 800 pounds before and after the mix has gone through the sweating stage. This should tell us that our Spence Plaster Compound casts should be used if possible before they have gone through this sweating stage.

The deterioration of Spence Plaster Compound casts during the process of vulcanization begins at approximately 300 degrees Fahrenheit, or at about the point where the flow of most rubbers in the flask ceases. This is very desirable because it is very important that our matrix should retain its shape until our denture is fully formed.

This disintegration advances with the heat up to 340 degrees Fahrenheit, at which time it has reached a disintegration point of about sixty per cent.

I have been able to register about two one-thousandths of an inch contraction in Spence Plaster Compound, but never any expansion; however, in my estimation this change is so small that it is of very minor importance.

Inasmuch, then, as compression is one of the chief requisites of a cast material, and as Spence Plaster Compound when properly mixed stands very high in compression, and inasmuch as it retains this characteristic after the flask is placed in the vulcanizer and the heat applied to a point of temperature past the rubber flow, then I believe you must agree that it is a good cast material.

There are few men who realize the enormous pressure applied on the face of a cast in closing a flask. Dr. Prothero, of Chicago, earned the credit for working this out years ago. He found that by using fifty pounds pressure as an average on the end of a four-inch ordinary flask wrench, with a one- to twenty-pitch ordinary flask bolt, that the face of the cast was subjected to the almost unbelievably terrific strain of over *four tons per square inch*; to be exact it was 8333 pounds plus.

Does this one thing alone explain to any of you men why some of your dentures do not meet all your expectations as regards adaptation and antagonization?

Spring pressure for flask closing is correcting this trouble to a marked degree, but even yet we must exercise more care in our flask closing.

The technic for constructing casts is simple and to most of the profession old.

The impression is imbedded in a heavy mix of plaster of Paris which is termed the foundation reinforcement. This should be about one-eighth-inch thick at its thinnest place, and averaging about one-quarter-inch in thickness. This should be trimmed so that its edges will extend laterally and at right angles to the margins of the impression about one-eighth of an inch.

Next is added a layer of modelling clay which is carried to the turn established by the muscle-trimming and at right angles.

This modeling clay is much better for this work than plaster of Paris because it has no expansion or contraction and is much more easily adapted to the borders of the turn on the impression, and eliminates the danger of breaking frail margins.

Around this reinforcement is then placed a strip of paraffin wax and sealed at the base of the reinforcement so as to be water-tight. This wax border is next trimmed for height. This is easily determined by placing a straight edge from border to border and trimming so that the thinnest part of the cast will be at least one-quarter-inch thick. This wax border may be still further reinforced with plaster of Paris if the wax is very thin. In place of using the paraffin wax for this part of the boxing some men use waxed linen strips, tea-lead strips, rubber-tube banding, cardboard, and many similar things; but I believe that the method given is much better for many reasons.

The entire boxing and impression is now coated with a twenty per cent. solution of shellac in alcohol (filtered). As soon as this is dry, paint with a fifteen per cent. solution of sandarac in alcohol (filtered). When this coating has thoroughly hardened, fill with soapsuds, using a heavy laundry soap in preference to some of the lighter toilet soaps. This soap is then immediately flushed out, but a sufficient amount will remain to act as a separating medium between the cast and the separating mediums proper, and preventing them from sticking to the face of the cast.

The boxing is now filled with water and permitted to stand for from five to ten minutes. This water is now poured into the plaster bowl and will be found to be about the correct amount to use for the proper mix of Spence Plaster Compound for this particular case.

The Spence Plaster Compound is now added to this water in sufficient quantity to make a heavy dry mix. This is kneaded in the soft rubber plaster bowl, using the hands in preference to a plaster spatula. When the mix attains a heavy, putty-like consistency, it is taken from the plaster bowl and kneaded in the hands, using a rotating or sliding movement to insure the breaking up of any lumps of the material, and insuring a smooth even mix. When it is thoroughly mixed, a small piece about the size of a hickory-nut is pressed in the hands to expel all the air and then placed in the center of the impression. The case is then jarred or beaten up and down on the laboratory bench, table, or something similar, until the Spence Plaster Compound spreads and fills all the fine lines and details of the impression. More Spence Plaster Compound is added until the boxing is filled. There are many special lathe devices used in jarring this Spence Plaster Compound mix into place; but the simple method of beating it down as I have described has been much more satisfactory in my hands.

The cast may be separated in from three to five hours; however, whenever possible it is advisable to let it set longer or over night if convenient.

Dental College, Western Reserve University.

Tennessee State Dental Association

The fifty-fourth annual meeting of the Tennessee State Dental Association will be held at Nashville, May 17, 18, 19, 20, 1921.

J. J. VAUGHN, D.D.S., *Chairman Pub. Com.,*
Nashville, Tenn.

PROGRESS IN DENTAL EDUCATION*

BY H. E. FRIESELL, B.S., D.D.S., LL.D., PITTSBURGH, PA.

DENTISTRY as an organized profession dates back only to the year 1839. During the latter part of that year was first issued the *American Journal of Dental Science*, the first periodical published in the field of dentistry. February 1, 1840, a charter was granted by the legislature of Maryland to Drs. Hayden, Harris and others incorporating the first dental college in the world, the Baltimore College of Dental Surgery; and on the 18th of August in the same year, the first dental society was formed in New York City and called the American Society of Dental Surgeons. During the session of 1837-1838, Dr. Horace H. Hayden delivered a series of lectures on dentistry in the Medical College of the University of Maryland, and undoubtedly it was from this germ that organized dental education sprang.

That there was great need for such organized instruction in dentistry was evidenced by the immediate and continued success of the Baltimore College of Dental Surgery, and the early establishment of many other schools in all parts of the country.

In 1907 there were fifty-six dental schools in the United States employing 676 professors and 653 special and assistant instructors and, enrolling 6,876 students. The graduates of these schools in the year 1906 numbered 1,624.

For many years after the opening of the first school the dental course consisted of two four-month lecture courses in separate years; and a practitioner of five years or more could be graduated after one four-month course. A few years later the course was extended to two years of five months each. In 1884 a national organization of the dental schools was formed—The National Association of Dental Faculties—and as a result of the efforts of that body, in 1892 the course was lengthened to three years of five months each, and shortly thereafter to seven months yearly.

In 1893 the dental teachers of the country formed a national body which flourishes today under the name of the American Institute of Dental Teachers. As a result of the efforts of these two organizations, in 1917 the dental course was extended to four years of eight and one-half months each year.

Prior to the establishment of the first dental school, dental training could be obtained only in the office of a preceptor, and for many years thereafter, until all sections of the country were fairly well provided with schools, this method of studying dentistry existed. The United States Census Bureau's published statistics show that in 1902 there were 28,142 practicing dentists in the country, and of that number only 16,831 were graduates of dental schools. Eventually, however, all the states adopted dental laws, requiring a college education to practice dentistry, and state boards of dental examiners were appointed in all states to pass upon the qualifications of graduates who applied for licensure.

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*Read before the Section on Stomatology (A.M.A.), of which by special arrangement THE DENTAL SUMMARY is the representative organ for the dental profession.

With few exceptions the dental schools of this country were organized and maintained by private enterprise for many years before various universities saw fit to include dental education in their field. In some cases the dental schools of universities were organized by the university, but in most cases existing private institutions were taken over and became organic parts of the university.

The influence of the examining boards and their national organization, the National Association of Dental Examiners, has had a salutary effect in encouraging private schools to provide adequate education for their students. Approximately seventeen years ago the National Association of Dental Examiners established a tabulation of the reports of the state board examinations of the output of all the dental schools, with the result that the quality of dental education has been raised very markedly.

A summary of the tabulation of dental state board examinations for the last ten years is given in Table 1.

TABLE 1

Year	Number of Graduates	Number Examined	Passed	Failed	Percentage of Failures
1910.......	1,646	1,295	1,102	193	14.9
1911.......	1,742	1,372	1,211	161	11.7
1912.......	1,940	1,507	1,274	233	15.4
1913.......	2,022	1,564	1,320	244	15.6
1914.......	2,254	1,783	1,380	403	22.6
1915.......	2,388	1,874	1,568	306	16.3
1916.......	2,894	2,459	2,029	430	17.4
1917.......	3,056	2,596	2,266	330	12.3
1918.......	3,366	2,918	2,510	408	14
1919.......	3,597	3,141	2,667	474	15
Totals....	24,905	20,509	17,327	3,182	15.5

The best information available indicates that there were 36,823 dentists practicing in the United States in 1908; and the figures for 1919 are approximately 44,000. During the period from 1908 to 1919, inclusive, there were approximately 28,500 graduates. These figures show an average yearly graduation of 2,375 for the twelve-year period, and a yearly wastage of 1,777: a net annual gain in dental practitioners of 598.

The figures given in Table 2 indicate the growth in schools and enrollment at periods during the last forty years.

TABLE 2.—GROWTH IN SCHOOLS AND ENROLLMENT IN FORTY YEARS

Year	No. of Dental Schools	No. of Students	No. of Graduates
1880	16	730	266
1890	27	2,696	943
1900	54	7,928	2,029
1907	57	6,919	1,754
1919	46	*	3,597†
1920	46	9,302	‡

* No figures.
† Last three-year class.
‡ Year not finished. Senior students enrolled, 1,042.

In view of the astonishing increase in the demand for dentists that has arisen during recent years, the existing dental schools will be taxed far beyond their normal capacity to meet such demand, and established universities in logical centers should recognize the necessity for providing adequate dental education for the communities they now serve in other fields of education.

A glance at the table of enrollment of students in the existing dental schools indicates the totals for the year 1919-1920 given in Table 3.

TABLE 3.—ENROLLMENT IN THE FORTY-SIX EXISTING DENTAL SCHOOLS

Senior students	1,042
Junior students	1,885
Sophomore students	1,983
Freshmen students	4,392
Total enrollment	9,302

The small number of seniors is due to the fact that the class of 1919 was the last regular three-year class, and many of the present seniors are hold-overs, or men who were in government service during the war. The unusually large freshman class also probably includes a certain percentage of students who would have entered school a year or two earlier but for the war.

In the matter of entrance requirements, dental education has passed through periods of evolution similar to that experienced by medical education. For the first half century of the existence of dental schools, virtually no preliminary education was required beyond that of "a good English education," which was fairly uniformly interpreted to be a grammar school education, or anything beyond. Beginning somewhere between 1895 and 1900, the schools began to request first one year of high school work for entrance; then two, and later three; but it was not until within the last ten years that graduation from a first grade four-year high school has been made obligatory, and this has come about very largely through the efforts of the Dental Educational Council of America. The latter body was organized in 1909, and is composed of five representatives from each of the three national dental organizations then existing, namely, the National Association of Dental Examiners, National Association of Dental Faculties, and the National Dental Association.

The Dental Educational Council has made an exhaustive study of the conditions existing in dental education, and a thorough inspection of the dental schools of the country. At the outbreak of the war in 1917 this body had collected much valuable data bearing on the standing

TABLE 4.—DENTAL SCHOOL ENROLLMENT FOR THE YEAR 1919-1920

	Year				
School	1st	2d	3d	4th	Total
1. Northwestern University Dental School	265	74	61	47	447
2. College of Dentistry, Univ. of Minnesota	87	124	91	81	383
3. Vanderbilt Univ. School of Dentistry	48	13	9	6	76
4. Louisville College of Dentistry	34	21	20	19	94
5. Western Reserve Univ. School of Dentistry	95	39	36	7	177
6. Chicago College of Dental Surgery	127	68	98	123	416
7. Univ. of Mich. College of Dental Surgery	186	70	64	34	354
8. Ohio College of Dental Surgery	49	17	15	19	100
9. Univ. of Calif. College of Dentistry	130	44	38	20	232
10. University of Iowa College of Dentistry	180	58	40	7	285
11. Indiana Dental College	84	51	40	..	175
12. Kansas City-Western Dental College	100	63	46	20	229
13. Univ. of Buffalo College of Dentistry	66	40	57	9	172
14. School of Dentistry, Univ. of Pennsylvania	254	112	123	51	540
15. Baltimore College of Dental Surgery	29	16	41	39	125
16. Philadelphia Dental College	84	30	26	23	163
17. Cincinnati College of Dental Surgery	12	..	..	1	13
18. St. Louis Dental College	58	19	38	5	120
19. Ohio State Univ. College of Dentistry	90	20	20	28	158
20. Washington University Dental Department	40	16	16	3	75
21. Univ. of Pittsburgh School of Dentistry	207	103	67	37	414
22. New York College of Dentistry	258	119	138	58	573
23. Univ. of Illinois College of Dentistry	108	41	28	17	195
24. Tulane Univ. College of Dentistry	37	16	13	4	70
25. College of Dental and Oral Surgery, N. Y.	168	116	188	29	501
26. University of Southern California, College of Dentistry	104	47	37	22	210
27. Colorado College of Dental Surgery	48	40	15	12	115
28. Tufts College Dental School	201	116	78	17	412
29. Georgetown Univ. Dental Department	53	16	22	24	115
30. Creighton Univ. College of Dentistry	60	28	22	3	113
31. Med. College of Virginia Dental Department	45	17	16	4	82
32. Univ. of Tennessee College of Dentistry	15	13	6	20	54
33. University of Maryland Dental Department	50	23	23	14	110
34. Harvard University Dental School	79	39	36	26	180
35. George Washington University, Department of Dentistry	21	11	19	14	65
36. North Pacific College of Dentistry	191	61	49	10	311
37. Marquette University Dental School	168	92	48	..	308
38. Atlanta-Southern Dental College	129	42	40	10	221
39. Loyola Univ. School of Dentistry	15	10	5	3	33
40. University of Nebraska College of Dentistry	71	20	9	9	109
41. College of Physicians and Surgeons, Dental Department	27	20	38	28	113
42. Texas Dental College	20	4	3	30	57
43. Baylor University	21	11	26	9	67
44. Howard University Dental Department*	110	30	38	37	215
45. Meharry Dental College*	160	46	35	55	296
46. Univ. of West Tennessee, Dental Department*	8	7	7	8	30
Totals	4,392	1,983	1,885	1,042	9,302

*Schools for negroes.

TABLE 5.—SUGGESTED STANDARD SCHEDULE FOR FOUR-YEAR COURSE IN DENTISTRY, WITH PRELIMINARY REQUIREMENT OF FIFTEEN HIGH SCHOOL UNITS

	Hours		
	Lectures or Recitations	Laboratory	Total
FRESHMAN			
English	64	...	64
Physics	...	48	48
Chemistry, inorganic	64	128	192
Biology	32	64	96
Anatomy	32	96	128
Histology	32	64	96
Dental anatomy	16	96	112
Operative technics	16	96	112
Prosthetic technics	32	288	320
Technical drawing	...	48	48
Total	288	928	1,216
Hours per week	9	29	38
SOPHOMORE			
Chem., met., org., physiol	32	128	160
Anatomy	32	128	160
History, dental	16	48	64
Physiology	64	...	64
Materia medica and pharmacology	32	48	80
Bacteriology	32	96	128
Operative technics	48	96	144
Prosthetic technics	32	288	320
Total	288	832	1,120
Hours per week	9	26	35
JUNIOR			
Physiology	32	48	80
Physical diagnosis	16	...	16
Pathology, general	32	48	80
Pathology, dental	32	48	80
Surgery	16	...	16
Anesthesia	16	...	16
Radiography	16	...	16
Mouth hygiene	16	...	16
Orthodontia	16	32	48
Comp. dent. anat	16	...	16
Operative dentistry	32	...	32
Prosthetic dentistry	32	96	128
Clinic	...	576	576
Total	272	848	1,120
Hours per week	8½	26½	35
SENIOR			
Pathology, dental	32	...	32
Oral surgery	32	64	96
Orthodontia	32	...	32
Operative dentistry	32	...	32
Prosthetic dentistry	32	...	32
Jurisprudence, history, ethics, economics	32	...	32
Seminar	32	...	32
Clinic	...	832	832
Total	224	896	1,120
Hours per week	7	28	35

and efficiency of dental schools, and it was selected by the War Department as the best-equipped agency to do such work, and at the request of the War Department and in cooperation with some of its representatives, a classification of the dental schools was made for and approved by the department, which was guided in its recognition of dental schools by the council's classification.

In the matter of curriculum, the schools have advanced from a very limited list of subjects that were taught largely didactically to a carefully-graded and balanced course of study, well provided with laboratory work, which year by year has been approaching more closely the basic curriculum of medical education.

The guiding influence in dental education, which has been effective for the last decade, is the Dental Educational Council. On account of its tripartite composition, including examiners, educators and representatives of the National Dental Association, this body has been able to bring about a constructive survey, inspection and classification of dental schools that has produced great advances in every phase of dental education. The work has been done along lines parallel to that of the Council on Medical Education and Hospitals, with the result that dental education today is on a far better foundation and a more uniform basis than it ever has been before.

At present the council is revising its requirements for Class A schools, and is preparing a recommended curriculum that will closely approximate the schedule given in Table 5.

There is a tendency on the part of some schools to require a predental college year for entrance in 1921, and two predental years in 1926. In view of the great demand for dentists and the limited number of dental schools, the wisdom of requiring a predental year at this time is worthy of serious consideration.

The gradual development and enlargement of the dental curriculum, always more closely approaching that of medicine in many subjects; the advancement of the entrance requirements, and the general supervision of dental education by the profession as represented in the Dental Educational Council, will eventually bring dental education to a point at which the foundation training will be practically the same as that of medicine.

Highland Building.

PYORRHEA—YOUR CONTRIBUTION*

BY C. C. SHERWOOD, D.D.S., TOLEDO, OHIO

BY the title "Pyorrhea—Your Contribution," I wish to convey what the dental surgeon contributes towards the real causes of pyorrhea, by overlooking certain factors in his daily practice, which is perhaps the primary cause of pyorrhea.

Therefore, the real object of this short paper is again to call to your attention these apparent small details in your every-day practice and give some suggestions for their correction, that pyorrhea may be prevented.

"Swat the fly" has long been supplanted by "Starve the fly." Why not starve the pyorrhea by dealing in those things that spell prevention?

The time has certainly come for a more accurate and a more careful diagnosis. Why is it not good common-sense practice to treat with causative factors, instead of being called upon to deal with a well-defined disease itself?

Many dentists are excusing themselves, with the fact that they are not treating pyorrhea and should not be called upon to give a careful diagnosis of incipient cases.

I find it an every-day occurrence that cases which have been carelessly passed as being free from infection, are in reality many times so far advanced as to necessitate radical extraction.

Some dentists even persist in the old idea that pyorrhea cannot be cured. This comes mainly from the fact that they cannot recognize pyorrhea until it is in its incurable stages.

Surely this is most confusing to the public and in need of early correction. The public expects the doctor of medicine to recognize appendicitis, when the symptoms are present, even though he does not operate the case. Such should be expected of the dentist in general practice in regard to pyorrhea.

Again, a careful conscientious periodontist may diagnose his case as pyorrhea, only to be reversed by one less active and informed along this particular line of dentistry.

Only the other day I had this case present itself: A woman thirty-one years of age was sent to me for treatment, as the dentist referring the case did not treat pyorrhea. The case indicated need of medical attention. I advised a Wassermann, explaining to the patient in detail what it all meant to her. The Wassermann was reported positive and naturally the patient was much discouraged. I advised she have immediate attention from her physician. A little later the patient returned, stating that the old family doctor who had taken care of all her ancestors—assured her that the family tree was free from any such infection and that the positive Wassermann meant nothing, and she need not let the matter disturb her any further.

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*Read before the Ohio State Dental Society, December, 1920.

I merely cite this particular case as but one of many where dentists and physicians do not agree.

However, the medical and dental professions are rapidly coming to a better understanding and the near future will see a most happy relationship between them.

I often wonder how seriously, if at all, the dental profession has taken the question of traumatic occlusion as given to us by Dr. Stillman.

To me it is of such vital moment that without this every-day practical application, my practice of dentistry would fail.

We are told by the prosthodontist that in his cases of full upper and lower dentures, the question of traumatic occlusion is of vital importance.

For should any point be in premature contact, the case is liable to fracture. The same is true when the natural teeth oppose a full upper denture or the reverse.

The traumatic stress will produce a lesion affecting the natural teeth instead of a fracture as is the case in your artificial dentures; the radical stress will produce an irritation which should be recognized as a forerunner of pyorrhea.

Let me particularly emphasize the partial denture. One of our real problems is to avoid undue stress on the teeth to which partial dentures are attached. These teeth always will be prematurely lost unless there be an equal distribution of stress while the teeth are in function.

The prosthodontist is recognizing the need, and much time and effort is being spent on a mechanical attachment which will solve this problem.

I am certain many have noticed over and over again the failures of the fixed crowns and bridges. Here again there has been no consideration for traumatic stress and sanitation.

Many mechanically-perfect crowns and bridges must eventually be lost because the teeth to which the attachment is made cannot withstand the traumatic stress, and sanitary conditions cannot be maintained.

All other operations in dentistry, including inlays, fillings, etc., should be done with consideration for these important factors.

We have in the past, unknowingly been large contributors to pyorrhea, and one of the great problems confronting future dentistry is the recognition and solving of them. In order to accomplish this the public as well as the profession must be educated.

I find it good practice to get the patient's viewpoint with reference to his particular case. With a patient whose interest is sincere, who displays a reasonable amount of intelligence, one has but little trouble in getting a hearty cooperation. We often find a decided lack of interest. The case may be one in which sister, brother or relative is greatly interested, but the patient shows but little concern about himself. This latter type is eliminated from my practice as I cannot find time or be interested in such cases.

Another important procedure for the prevention of pyorrhea is the brushing and care of the teeth. This is something that has in the past been left almost entirely to the discretion of the patient. It is only but very recently that the attention of the dental profession has been called to note the great importance of this part of mouth hygiene.

Dr. Hartzell has taken this matter up at length in a paper published in the September DENTAL SUMMARY. He has experimented extensively with proper brushing of the teeth and found that wonderful results have been possible. In incipient cases of pyorrhea he finds that proper and continued brushing is more efficient than instrumentation. There is no doubt that this is a field of prevention that has long been overlooked by the dental profession.

The old horizontal idea of brushing the teeth is correct so far as it goes, but the patients must be taught to go much further if they would prevent pyorrhea and tooth decay.

If the public can be taught the correct brushing of the teeth, we have solved "first aid" to dentistry.

Although there has been much diversity of opinion regarding the best methods of tooth brushing, it has resolved itself broadly into the use of the combined vertical and horizontal strokes or interdental brushing.

I follow Dr. Hartzell's method almost entirely with most splendid results.

One of the most convincing arguments to patients for proper brushing, is to stain the bacterial plaques on the teeth, then have them brush their teeth after their usual method. Now demonstrate how inefficient this is by the amount of bacterial mold left on the teeth. Then brush the teeth after the *new method* of interdental brushing and the results will convince any intelligent patient.

May we hope in the generations to follow us that the dentist may be almost eliminated. That the public will have learned through proper instruction such care for body and teeth that but few doctors or dentists will be necessary for a community. Is this dream too far removed for us to think on or can our efforts today make this a reality in the near future?

INDUSTRIAL DENTISTRY*

BY E. L. PETTIBONE, D.D.S., CLEVELAND, OHIO

THIS PRESENTATION is, in a way, but a report of our oral hygiene committee.

Four years ago when Dr. F. M. Casto was elected president of this society, he, having foreseen the wonderful outlook for industrial dentistry, had the name of the committee changed to the Industrial, Educational and Oral Hygiene Committee.

Dr. Carl E. Smith, dental director for the B. F. Goodrich Co., of Akron, Ohio, was appointed a member of the committee, and the committee voted to make a survey, a study, of industrial dentistry.

We visited the eastern dental dispensaries at the time the National Dental Association met in New York City, and at other times visited many of those in Ohio as well as those in the west.

We secured an accurate list of all dentists employed in plant dental dispensaries, and issued a call for a meeting in Chicago, in August, 1918. At this meeting we organized the National Association of Industrial Dental Surgeons. We have met twice a year since at the time of the National Dental Meeting and the National Safety Council Meeting.

We were helped at the time of our organization and thereafter by the officers of the National Safety Council, and we became associated with the council and have taken part in each of their annual meetings by providing speakers for the Health Service Section. This gave us the best kind of opportunity to reach the managers, superintendents, welfare directors and medical directors of the leading plants of the United States.

I will not try to give you in detail the type of dispensaries, their scope, or their number. That you had presented to you in the May, 1918, issue of THE DENTAL SUMMARY, through courtesy of our worthy editor, Dr. Bethel.

I want to call your attention to the fact that there are now twenty-two factories employing twenty-five members of our society.

The following is the list:

1	B. F. Goodrich Co., Akron, Ohio	Carl Smith, W. J. Peart and R. B. Church
2	The Firestone Tire & Rubber Co., Akron, Ohio	W. J. Easton
3	The Goodyear Tire & Rubber Co., Akron, Ohio	
4	The International Harvester Co , Akron, Ohio	
5	Lunkenheimer Co., Cincinnati, Ohio	H. W. Baker

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*Read before the Ohio State Dental Society, December 1920.

6	Worthington Pump & Machine Co., Cincinnati, O.	M. C. Schuman
7	Cincinnati Milling Machine Co., Cincinnati, Ohio	A. D. Hewetson
8	La Blonde Machine & Tool Co., Cincinnati, Ohio	J. P. Becker
9	National Lamp Co., East 152nd Street, Cleveland, O.	W. S. Weilage
10	National Lamp Co., Nela Park, Cleveland, Ohio	E. E. Belford
11	National Lamp Co., East 45th Street, Cleveland, O	Phillip S. Osgood
12	The Kaynee Co., Cleveland, Ohio	A. H. Shallheim
13	The Joseph & Feiss Co., Cleveland, Ohio	L. V. Walton
14	Bailey Co., Cleveland, Ohio	
15	Cleveland Dental Mfg. Co., Cleveland, Ohio	Russell J. Cook
16	Delco Light Co., Dayton, Ohio	D. E. Reese
17	Delco Co., Dayton, Ohio	D. E. Reese
18	National Cash Register Co., Dayton, Ohio	H. M. Brewer, E. F. Gowdy
19	Hoover Rentschler Co., Hamilton, Ohio	W. E. Smith
20	James B. Clow & Sons, Newcomerstown, Ohio	R. R. Mason
21	National Lamp Co., Niles, Ohio	H. H. Jamison
22	National Lamp Co., Warren, Ohio	Chas. M. White
23	National Lamp Co., Youngstown, Ohio	T. J. Evans

As chairman of this committee and secretary of the National Association of Industrial Dental Surgeons it has been my pleasure to visit many dental dispensaries and to meet most of the men engaged in this work; and from my viewpoint (not being employed by a corporation or engaged in the work), I want to say that there have been some very unjustifiable statements made in our magazines relative to the men employed in this work and the spirit in which the work is furnished.

The general rule of all industrial dental clinics is educational work first and foremost; that is, preventive dentistry.

Dr. Ralph W. Elliott, the medical director of the National Lamp Co., who has established fourteen dental dispensaries and has fourteen more planned throughout the United States, makes it a rule that before the equipment arrives the director must get over the educational work—the preventive dentistry. When we visited Dr. Canning, one of his directors at Central Falls, R. I., plant, he told us that he spent six weeks talking to the people in his plant before his equipment arrived.

Right here I want to call especial attention to the pamphlets distributed by the Goodrich Clinic, "A Man is Known by the Teeth he Keeps," and the one distributed by the National Cash Register Co., "Good Teeth, Good Health."

These were written by members of our committee, have had wide circulation, and have been very widely copied and anxiously sought and eagerly used by state and government health authorities.

The reprint "President Roosevelt's Teeth," issued by the Goodrich Clinic did inestimable good among their employees.

Through your committee's association with industrial dentistry we have found a means of reaching the adults. We concluded ten years ago that we would have to be satisfied with educating the children; but by our further association with the National Safety Council, we are now able to reach four and a half million workers of the United States. We have contributed materials for bulletins and we want you to furnish us anything you may have that is suitable for factory bulletins which meet the attention of these workers throughout the United States.

We had hoped to show you these bulletins in our clinic but the United States Public Health Service requested them, so we will have to be satisfied with showing you lantern slides of them.

In conclusion I want to tell you of the dental dispensaries established by industries for the children of their employees. There are three concerns doing this most extensively, the Colorado Fuel and Iron Co., The Tennessee Iron, Fuel and Railway Co., and The Pocahontas Coal & Fuel Co.

The first-named is doing an admirable work in Colorado. The second has fourteen dentists in the country surrounding their plants in the south, and the last has about six dentists in the mountains of West Virginia, and of this last I want to say a little more.

A few years ago Dr. Epling a practicing dentist in a small town, Maybeury, in West Virginia, induced the manager of a coal mining company to start dental clinics for the children of his employees, which he did for a year, after which he induced the operating company to take over the expense and make it a permanent affair. This made such a hit with the coal operators and the people of influence in that part of the state that they went to the legislature and had a law passed authorizing a tax levy to provide free dentistry for all school children of McDowell county. The law also called for a referendum, and before election we loaned them lantern slides and motion picture films and helped them with lectures so that the referendum carried three to one. This year the tax provided $50,000, and next year $55,000.

Dr. Epling obtained forty outfits from the government for this work, and it may be interesting to you to know that so thoroughly were the public officials of the state interested in his getting them that he had the personal help of Senator Elkins, and a letter from the Governor saying he would come to Washington any time he wanted him.

Haven't you some employer in your practice whom you can help persuade to establish an industrial dental dispensary in his plant? Your committee stands ready to help you. Ohio leads in mouth hygiene work; Ohio leads in number and quantity of plant dental dispensaries. Won't you help keep Ohio ahead?

6503 Detroit Avenue.

PREVENTIVE DENTISTRY*

BY E. S. BRAITHWAITE, D.D.S., WILLARD, OHIO

WERE I to use a text for this short treatise, it would be taken from first Corinthians, 16: 13, where Paul, in admonishing the Corinthian dentists said: "Watch (your dental magazines), stand fast in the faith (of Preventive Dentistry); quit you like men—be strong." And applied to present-day conditions, I believe it means be "strong" in your endeavor to educate the people to the positive need for oral prophylaxis and oral hygiene.

Secretary of the Navy Daniels said recently that, "The world has not yet recovered from shell shock." If the people of the United States realized that there are within its boundaries over eighty millions of people for whom no dental provision exists today, neither preventive, curative nor reparative, and, if they realized their appalling need of oral hygiene and preventive dentistry, their "shock" would be much more severe than shell shock. If the members of the dental profession expect to cope with the gigantic problem of present-day conditions, they must, individually and collectively, "put their house in order." In times past we have been busy with the mechanical repairs of damage done by caries—today the *preventive* phase *must* predominate.

At best the medical profession can only repair and patch up the effects of disease which the dental profession, if *it lives up to its duty*, can *prevent*. Surgeons tell us that after a cancer first starts, that on an average, a period of eight years passes before the *first operative stage* is reached; and the dentist, in connection with a bacteriologist can find the germs at this early date, thus preventing surgical intervention. Surgeons complain that the average case of cancer reaches them after it is too late.

Prevention should mean the use of such measures as prevent the occurrence of a suppurative alveolar abscess or a blind abscess; also, as to prevent caries, or any other condition leading to focal infection in the mouth. Our greatest opportunity is in the treatment of the baby's mouth and teeth. We realize that "caries is essentially a disease of childhood and youth; and that most of the conditions which require the attention of the dentist during adult life have had their origin in childhood." Dr. A. C. Fones, states that, "It is hard to find two children out of a hundred with perfectly sound teeth, and, even in early childhood, our school children average *seven* cavities per child." Dr. Fones also has stated that, "American mothers who have for generations been educated to look upon free sugar as a food, must now be taught that free sugar is the chief cause of dental decay, and that dental decay is the chief cause of many of the *serious* illnesses of childhood and adult life."

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*Read before the Ohio State Dental Society, December, 1920.

Every dentist should join in the educational campaign for mothers. It has been suggested that instead of starting with the mother when the child is six months of age, that we start with the grandmother at six months of age, thus educating them as to the proper *food needed* to produce normal teeth in the coming generation.

Dr. R. W. Bunting has pointed out that our duty lies in the prevention of infection entering the body through the mouth tissues. Hence we are concerned chiefly in preventing *pyorrhetic conditions* and *devitalized teeth.*

Dr. Chas. H. Mayo says that, "Diseases of middle life are increasing. They are microbic, of a chronic recurring character, and are carried into the blood stream from a few foci, the mouth being the source of greatest danger." Dr. Mayo also states that he, "Has far less fear where nature loosely holds the bacteria; that 'the dangerous ones always are under tensions, and in small areas'." In other words, the blind abscess is far more dangerous than the suppurating alveolar abscess. Hence, based on our present-day knowledge, *preventive dentistry* is the best opportunity to which we have recourse in rendering that degree of service worthy of our profession.

In passing let me state that our esteemed president, Dr. Chas. W. Mills is conducting one of the most interesting clinics in preventive dentistry in the state of Ohio, in his treatment of the temporary teeth with the ten per cent. silver nitrate solution. It would be well worth your time and effort in travelling to Chillicothe to see Dr. Mills' clinic.

Dr. John V. Conzett, in his president's address before the National Dental Association, in Boston, said in substance: "No *matter* with which we have to deal, is of more importance than educating the public in regard to the necessity for oral hygiene, and prophylaxis. We cannot hope to cope with the problem of oral health by the measures which we have been pursuing in the past. Tooth decay and pyorrhea are advancing far more rapidly than are the remedial measures which we are instituting, and the only hope for the future lies in the prevention of these diseases through the instrumentality of a knowledge of the beneficial effects of a clean mouth."

Dr. L. P. Anthony, of the *Cosmos*, says that, "The profession has long ago come to a realization of the hopelessness of fulfilling its mission through the means of reparative dentistry, and is now concentrating its efforts in the direction of *prevention.*" Also that, "The tendency today is toward rationalism in the practice of preventive dentistry, as the only hope for properly fulfilling the humanitarian mission of dentistry, as a most important branch of the great healing art."

Many of the leading members of the profession believe that the dental hygenist is the solution to the problem of giving to the *greatest* *number*, the benefits of *preventive dentistry* so urgently demanded by the medical profession. Dr. E. C. Kirk in a recent editorial says: "We feel reasonably sure that the dentally-trained nurse or dental hygienist will prove to be as useful an adjunct to the practice of preventive dentistry as the trained nurse is to the practice of medicine." Dr. Kirk further says: "Preventive dentistry is a present need demanding immediate attention, and as the dental hygienist has long since passed out of the experimental stage and definitely proven her usefulness, the dental profession cannot afford longer to evade the issue. The hope of the future in dentistry as well as medicine, is prevention, and the hope of prevention of dental diseases to any considerable degree in the future, lies in oral prophylaxis systematically and presistently prosecuted."

Realizing that the dental profession sits, as it were, at the feet of such scientists as Dr. Thomas B. Hartzell, I recently have requested an opinion from him in regard to preventive dentistry, to bring to you at this time, knowing that you will receive it with open minds. Dr. Hartzell says, "I believe preventive dentistry to be the truest expression of the best there is in the dental profession today. It involves prophylactic service of the highest type. I believe dentistry has it in its power, by disseminating the knowledge which we at the present time have, to save yearly, thousands of lives which in the past have been lost.

"It means for the child, a better body, a better mind, a greater resistance to the other ills to which flesh is heir, and a better citizen than can be produced without dental prophylaxis. The micro-organisms which grow most prolificly in the mouth are the ones which cause the greatest loss of life when transplanted to other areas of the body, for the ravages of the streptococcus destroy more lives than do any other two or three types of bacteria combined.

"Preventive dentistry seeks to produce a type of immunity which protects the body from the ravages of these mouth-grown organisms, and in so doing increases the health of the body politic and increases the sum-total of human happiness. Therefore, the watchword of the dental profession should be a thorough understanding of oral prophylaxis, a thorough understanding of the life of the bacteria grown in the gateway to the body, the mouth, and a dissemination of this knowledge to the patient."

Griffin and Meier Block.

ORAL HYGIENE AND PREVENTIVE DENTISTRY*

BY THADDEUS P. HYATT, D.D.S., NEW YORK CITY, N. Y.

ORAL HYGIENE embraces a knowledge of those agencies which affect the preservation and maintenance of the health of the teeth and surrounding tissues. It includes a knowledge and understanding of the chemical and physical structures of the teeth, the anatomy, and the reason for their shapes and locations. It requires a knowledge of pathology and bacteriology, the nutritional and mechanical value of foods. Tooth brushes, their uses and abuses, dentifrices, mouth washes, and medication are also properly included within the limits of oral hygiene.

Therefore oral hygiene is that part of dental science the object of which is the preservation of the health of the teeth and soft tissues of the mouth. It comprehends a knowledge of healthy teeth and gums, as well as the objects used and the methods employed to maintain this health. Its practice brings about "Growth more perfect," "Decay less rapid," "Life more vigorous," "Death more remote."

Preventive dentistry includes the correction of all conditions which help directly or indirectly to bring about the destruction of tooth substance or any unhygienic condition of the mouth. This work logically starts with the young child. It consists in regular and frequent prophylactic treatments. At about the fourth to fifth year, X-ray pictures should be taken to show location of permanent teeth. These pictures with the clinical evidence tell at an early age the need of orthodontic treatment. Orthodontic treatment is an important part of preventive dentistry and should be so recognized and understood. Occlusal surfaces should receive prophylactic fillings as soon as it is possible to place them.

At no time in the history of our profession has the need been greater than at the present time for every dentist to awaken to a realization of our opportunity and our responsibilities.

Our opportunity lies in the fact that both the medical profession and the laity are fully aware of the relation existing between dental conditions and the health of the body. The best minds and the deepest students in the medical profession today claim that the next step in preventive medicine is within the scope of dentistry alone.

Shall we grasp this opportunity?

Our responsibilities lie in the fact that our work is in that cavity which is the most important orifice within the whole body. All of those substances which are necessary to sustain life must pass through the mouth or be affected by the condition of the mouth. That the teeth are within the mouth adds to this responsibility.

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*Read before the North Carolina State Dental Society, 1920.

The pathology of the soft tissues of the mouth is aggravated by dental lesions, and in many cases is first brought about by dental caries and an unhygienic condition of the teeth.

It would be a simple matter to preserve a healthy and sanitary condition of the mouth if there were no dental organs present.

It can well be said that as clean food, fresh air, and pure water are the sources of life, so unclean and unhygienic mouths are the gateways to disease and even death.

As our work deals directly with these conditions, are we not, therefore, the responsible custodians of the health and life of the people? Will we accept these responsibilities?

If we accept these responsibilities what should be our plan of work?

First, to understand and realize the importance of, and necessity for, oral hygiene.

Second, to realize and appreciate that preventive measures should always *precede* reparative work.

Third, to realize that the health of the soft tissues of the mouth is of the greatest importance, as it not only affects the teeth themselves but it is often the primary field for pathological changes in the mouth.

IMPORTANCE OF ORAL HYGIENE

In some of the ancient books of India the manifested universe is divided into pairs of opposites, because, as they logically claimed, we can only appreciate things by their opposites. We would not know what light is were there no darkness. There could be no North Pole were there no South. We only know the inside because of the outside; and we can only know what hate is because there is love.

And so, perhaps, we can best understand the importance of oral hygiene by discussing some of the conditions found when it is absent.

We know that of all the organs of the body there are none that are so constantly exposed to those elements which are most detrimental to their integrity as are the teeth. Because of this they require more care and attention than is needed by any other part of the body.

Gies and Kligler have shown that by weight and count the number of bacteria per milligramme of tooth scrapings in a dirty mouth are about eight hundred million as compared to only five million in a fairly-clean mouth.

While it is true that bacteria will always be present in every mouth, clean or dirty, it is also true that bacteria in a clean mouth are practically harmless. Owing to the condition of a dirty mouth, consisting as it does of food debris, inflamed gums and its exudations, the bacteria change from being harmless and become virulent and dangerous, particularly when absorbed into the blood or lymphatics from pockets around the teeth. These bacteria are often carried into the pulp and bring about a lowered resistance within the tooth itself. This undoubtedly makes the tooth more susceptible to decay. As the decay penetrates deeper into the tooth it finds little or no resistance from the pulp, which soon becomes sufficiently infected so that the most skillful work cannot save it. We are then confronted with pulp pathology, pulp death and its sequel, systemic disturbances.

Figures are not lacking which conclusively prove that regular and frequent care of the mouth by those specially trained to give prophylactic treatment has brought about a reduction of dental caries and also of illness.

In the report of Dr. Fones of the work done in the public schools of Bridgeport he has shown that in one school there is a reduction of 67.5 per cent. of cavities in the permanent teeth. In five schools a reduction of 57 per cent. was obtained, and the average reduction among 20,000 children in thirty schools was 33.9 per cent.

As to the reduction of illness permit me to quote from Dr. Fones' report:

"Out of the death rates from all causes in this city we have been able to find records of the three diseases which are common among children, namely, diphtheria, measles, and scarlet fever. These are figured on a basis of per 100,000 population, and show the following percentages:

	1914	1918	Decrease
Diphtheria	36.5 per cent.	18.7 per cent.	48 per cent.
Measles	20.0 per cent.	4.1 per cent.	80 per cent.
Scarlet fever	14.1 per cent.	.5 per cent.	96 per cent.

"From the death-rate tables the general inference must be that the percentage of communicable diseases is gradually decreasing."

The retardation of pupils was reduced fifty per cent., and the cost for the re-education of these backward pupils was reduced from forty-two per cent. of the entire budget in 1913 to only 17 per cent. in 1918.

I remember speaking some years ago before the National School Hygiene Association upon the "Mental, Physical, and Moral Development of the Child Depending Upon Mouth Conditions." At that date the argument could only be based upon logical deductions from observed clinical cases. But how well are they substantiated by later-day figures.

NECESSITY OF ORAL HYGIENE

There is an average of five cavities in every mouth. This will give us, roughly speaking, over five hundred million cavities in the teeth of the people of the United States. Allowing one-half hour as being necessary to prepare and fill one cavity, this will mean it would take two hundred and fifty million hours to do this work. Leaving out holidays and Sundays, and allowing thirty days for illness and vacation and working six hours a day, six days a week, it will take over fifty-one thousand dentists three years to do the work. If one per cent. of this work is needed to be done over again from any cause whatsoever, we will have five hundred thousand additional cavities to take care of. If any of these teeth are in such condition as to need pulp removal and canal filling, the allotment of one-half hour for each cavity will be far too small. If to this is added the time necessary for cleansings, crowns, bridges, plates, extractions, etc., we will then gain some idea of the amount of time necessary to put the mouths of the people in good condition. We must also remember that there are not fifty-one thousand dentists in all the United States. But even if all this tremendous amount of work could be done we would still find that the cause which brought about this condition has not been removed. This will show us the fallacy and waste of time in attempting to solve this problem by reparative work alone.

Why is this problem so important? The answer lies in the fact that human nutrition is the most important problem of life. Malnutrition is one of the greatest factors in all diseases.

Municipal authorities, state and federal officials, are trying to solve this question of nutrition by providing clean and pure water to the people, and by food inspection to prohibit the manufacture of, or the sale of, contaminated and adulterated food.

Why is this being done? Because of the long and persistent efforts of the medical profession, and, also, because of the unanimity of their actions and the universality of their practice. I believe it will be found to be true that a far larger proportion of medical surgeons practice strictly within the limits of their teachings, and that in their schools the strictest enforcement of the laws of sanitary procedures are followed. Because of this unanimity of opinion and practice the medical profession has influence and authority with the members of the laity who are serving in official positions. Their views are the more readily passed into laws, and their authority upon health questions therefore becomes of greater importance.

This is not true of the dental profession nor of the dental colleges.

That the majority of dentists have faith in oral prophylaxis I do not believe.

That the majority of dentists have faith in preventive dentistry I do not believe.

So the success of the oral hygiene campaign always has been, and always must be, dependent upon the mental attitude and confidence of the dental profession in the truth and efficiency of dental prophylaxis and preventive dentistry.

Why should it be true that the dental profession as a whole is not greatly interested in prophylaxis and preventive dentistry?

First, largely from the fact that many of the colleges have not taught and do not teach oral hygiene or preventive dentistry as a truth or as a science.

Second, while all colleges teach cleansing of the teeth, this is more for cosmetic effect than as a scientific branch of preventive medicine, or as a hygienic measure. This is proven by the fact that persons are allowed to have any and all kinds of operations in the mouth without any attempt at first cleansing the field of operation. This attitude of mind or practice would not be allowed in any branch of surgery in any of the medical colleges.

Our first step is to invite those who are responsible for the teaching and practice in the dental colleges to make a fixed rule that no patient can have an operation of any kind until the mouth has been placed in a hygienic condition. No fillings inserted, no extractions done, no impressions taken, no X-ray work done, until the mouth is first clean and hygienic. This will impress upon the students the truth and the importance of mouth hygiene, and will also impress this fact upon the minds of the patients. Also it should be a rule that, before any reparative work is done, all occlusal surfaces of molars that have no decay should receive prophylactic fillings to prevent cavities starting.

The second step will be gained when no dentist will operate in the mouth until his patient has first received a prophylactic treatment. The patient will be informed of the why and the wherefore, and they will at once have more respect for the man who respects his own work, in that he refuses to jeopardize its usefulness by placing it in dirty or unhygienic environment.

In the past, the views of our profession in regard to malnutrition lay more in the idea that imperfect teeth would not permit of perfect mastication, therefore it was most important that everything should be done to preserve the masticating efficiency by mechanical restoration.

The relation of oral hygiene with malnutrition has been but little thought of, and today it is not fully recognized nor appreciated by the majority of dentists. When this truth is recognized and given proper importance in college education, and when it is understood and believed in by the majority of dentists and practiced by them, *then*, and not *until then*, will the profession of dentistry have influence and authority in the management or share in the control of things pertaining to *public health*.

As nutrition is the most important problem in the care of convalescent patients, it is astonishing to find that hardly a hospital in the country gives any attention to the scientific and proper care of the mouth. The difference between a clean mouth and a dirty one, from a bacteriological viewpoint, is so great that it may well be that the question of success depends largely upon mouth condition.

Much attention is given to the training of nurses in the preparation of food for patients, but of what value is such food when prepared in unclean, dirty, and germ-laden pots, pans, or dishes? It would be hard, however, to think of any cooking utensil as unclean and as harmful to the health of the patient as is an unclean and uncared for mouth, yet the vast majority of patients in hospitals have unclean and uncared for mouths.

No hospital is properly equipped to take care of patients, particularly those who are helpless and confined to their beds, that does not have a dentist in attendance and a complete staff of dental hygienists to give daily care to mouth hygiene.

None but those specially trained to do this work can properly understand how to care for the mouth, and the day cannot be far distant when those in charge of hospitals and sanatoriums will appreciate the necessity and importance of this work.

That success is attending the efforts of those who have worked for the oral hygiene movement is shown by the fact that nearly every wash-room on Pullman sleepers is now provided with a small basin over which passengers may cleanse their mouths. It is also shown by the fact that at least eighty per cent. of the men travelling today carry their tooth brushes. This was not so twenty-five years ago. While this is very gratifying to the oral hygiene workers, I am much impressed with the fact that our next step is to emphasize the importance of how to brush the teeth, and the amount of time that is needed to be able to properly cleanse them. In my travels during the past year I have taken the trouble to time the men using the tooth brush. Thirty-four seconds was the longest time and less than ten seconds the shortest time any man took in the use of the brush, and none, not one, used the brush correctly. By careful tests it is shown that it requires at least sixteen strokes of the brush in each section of the dental arch to remove all the stains made by the use of the iodin solution. Also that this is more efficiently done by the use of the circulatory method of brushing the teeth than by the sweeping method.

The benefit of careful mouth prophylaxis cannot be exaggerated. In fact, the claims made by those who have persistently and carefully followed this procedure are such that it is one of the most remarkable things to realize that even today the profession as a whole does not practice it. That business men are beginning to realize this truth is shown by the ruling recently made by the Metropolitan Life Insurance Company and published in their bulletin for April 29, 1919:

"The services rendered by the dental division since its establishment in 1915 have been so curative of impaired health conditions, and so permanently helpful to the employees who have taken advantage of the opportunities offered, that henceforth every home office employee will be required to undergo examination and cleansing of the teeth in the home office dental division twice a year. If the service of the family dentist is desired rather than that of the home office dentists such examinations and cleansings by him will be accepted, but they must be procured without expense to the company, and the employee must furnish a satisfactory certificate from him that the required work has been done."

That regular and frequent cleansings of the teeth by trained dental hygienists is of practical benefit is shown by the figures secured in the dental clinic of the Metropolitan Life Insurance Company.

The employees using the dental division have been divided into four classes, as follows:

Class 1. Those who first came in 1915 and have continued to come.
Class 2. Those who first came in 1916 and have continued to come.
Class 3. Those who first came in 1917 and have continued to come.
Class 4. Those who first came in 1918 and have continued to come.

By our system of recording we describe the condition of the mouth in regard to cleanliness under the heading, "Clean:" "Yes," "No," "Fair." The following table is given in percentages:

	Yes	No	Fair
Class 1 started in 1915	27 p. c.	25 p. c.	48 p. c.
Class 2 started in 1916	25 p. c.	27 p. c.	48 p. c.
Class 3 started in 1917	18 p. c.	29 p. c.	53 p. c.
Class 4 started in 1918	10 p. c.	50 p. c.	40 p. c.

This table shows:

First, that Class 1 is highest under "Yes" and lowest under "No."

Second, that Class 4 is highest under "No" and lowest under "Fair" and "Yes."

Third, that the classes show a gradual gradation toward improvement according to the number of years attending the clinic.

A study of Class 4 gives the following table:

	Yes	No	Fair
First visit in 1918	10 p. c.	57 p. c.	33 p. c.
Second visit in 1918	14 p. c.	33 p. c.	53 p. c.

This shows a gain of four per cent. in "Yes," a gain of twenty per cent. in "Fair," and a loss of twenty-four per cent in "No." In view of these facts it is true to say:

"The greatest sanitary reform in the world lies in the task of revolutionizing the unsanitary and infectious condition of the human mouth. Dentistry alone has the power to relieve humanity from the plague of mouth infection."

THE DENTAL HYGIENIST

As dentistry progresses and improves, it becomes more evident that dentists must have certain conditions present in their field of operation to enable them to give and to gain the best results from their work. No one condition can be, or is, of more importance than the securing of as clean a field of operation as possible. This is the work of the dental hygienist, and work for which she has been specially trained.

That there could ever have been any objection to having dental hygienists has always been a matter of surprise to me. I doubt if today there remain any who still retain their opposition. All realize that the amount of dental care needed by the people is far beyond the possibility of being successfully handled by the dentists alone.

Preventive measures of an educational nature must be established and maintained, and practical as well as theoretical instruction be given upon the proper care of the mouth.

The dental hygienist is specially trained to do this work—trained to give prophylactic treatment and trained to give instruction upon the home care of the mouth.

To my mind she has already proved her success and her value, and for many years the demand will far exceed the supply.

The dental hygienist is here to stay.

PREVENTIVE DENTISTRY

The work of preventive dentistry consists largely in preventing the formation of cavities in the teeth. A knowledge of the susceptibility of the different surfaces of the teeth will be of great help.

"We find that less than one per cent. of the lingual surfaces have decay. Four per cent. of the buccal surfaces, six per cent of the mesial, six per cent. of the distal, and then the percentage jumps to twenty-eight of the occlusal surfaces having decay. Such a large increase of cavities on this surface should surely attract serious and earnest attention."—*X. D. D. Smith, of Philadelphia.*

In studying the location of cavities in the first molars one is struck by the much larger number found in the occlusal surface as compared with all other surfaces. Roughly speaking we find the occlusal cavities are three times as many as the buccal cavities, five times as many as the mesial cavities, seven times as many as the distal cavities, nineteen times as many as the lingual cavities, and more than double the number of all cavities in all other surfaces added together. We also find thirteen and one-half per cent. of the first molars are lost or so badly decayed that they cannot be saved.

If the dentists of America will join hands and start a country-wide movement to prevent cavities forming upon the occlusal surfaces of permanent molars they will do more for preventive medicine than all the root-canal work ever invented or any other kind of dental reparative work.

The technic is simple. *First,* with a fine-pointed explorer loosen up any debris in the fissures. Place two or three drops of peroxid on the surface and work explorer in every part. Wash off with warm water. Dry and repeat with explorer and H_2O_2. Wash off again. Place cotton rolls on either side of the tooth. Dry, then wash off with Daken solution. Dry. Now use Howe's method of silver nitrate and dry quickly so as not to allow too much discoloration. Dry once more. Mix S. S. White Silver Cement to the consistency of condensed milk. Place cement on tooth and with fine explorer work down into all the crevices. Place a small square of tinfoil, gauge sixty, upon the cement. Use a burnisher and burnish the tinfoil to the tooth in every direction, working from the center toward the edges. As soon as cement is set, peel off the tinfoil, and any surplus can now be removed. This method will preserve the occlusal planes and all masticating efficiency.

This should be done for every patient under twenty years of age before any reparative work is started. It should be done as soon as the tooth is erupted. The only work which should precede this is prophylaxis or relief of pain.

If our profession will teach the people why this is done, and refuse to do any other work until it is done, American dentistry will confer one of the greatest blessings on mankind.

We find from the twenty-second year to the sixtieth year the occlusal cavities diminish in number while, on the other hand, the interproximal cavities increase in number. This will show us the importance of teaching patients how to floss the teeth and explain why, as they grow older, they should use the floss persistently and regularly.

While some may believe an acid mouth wash is desirable, my own observations show that the use of plain lime water is most beneficial. Eight hundred employees of the Metropolitan Life Insurance Company used lime water for one year and only fifty-three were found who did not show a change from the not clean class. Upon examination I found nearly all of them had fixed bridge work.

Pathology of the soft tissues should receive greater attention than is generally given, because in most cases it is so easily cured when proper and prompt attention is given. Of course I am referring particularly to those pathological conditions brought about through unhygienic environments, poor fillings, and traumatism.

Systemic causes should be recognized and consultation with the family physician secured at once so that proper treatment may be given.

In the December number of the *Dental Research Journal* is an excellent article on the "Bacteriology of Vital Pulps." This shows that vital pulps become infected through pathological conditions of the soft tissues surrounding the teeth. In some cases the gingivitis was not very marked. Any inflammation of gum tissues surrounding the teeth undoubtedly is attractive to bacterial life, and they are absorbed and carried by the blood and lymphatics into the pulp.

Of all organisms found, the streptococcus viridans were from three to four times more numerous than any of the other kind. This should show us the very great importance of dentists appreciating the practical and vital necessity of securing normal gum conditions at all times. This is particularly true with children. We do not as yet know what part inflamed gums play in the hindering of perfect tooth formation of the permanent teeth. That is, we have no figures to show that children whose mouths are kept perfectly clean and gums in healthy condition always have perfect permanent teeth. Logic and reason, however, must show us that inflamed gums and unclean mouth must prove detrimental to the proper building up of strong, sound teeth. The digestive functions are impaired and the assimilation of nutrition interfered with.

So in child life as well as in adult life, the condition of the soft tissues of the mouth must receive the constant and careful attention of the dentist. It is here that the greatest benefit can be secured by a systematic campaign of mouth hygiene among the children. Dental hygienists can be used to great advantage, and one dentist can oversee and direct the work of many hygienists.

The question of children's diet is of great importance in any oral hygiene campaign. Mouth cleanliness and proper foods are so interblended that it is difficult at times to differentiate and state which is the more important.

While we all understand that foods containing lime should be freely partaken of by the expectant mother and also given to the child, we must also consider the importance of what influence free sugar has upon the growing child.

But few persons know that the free sugar consumed in our country amounts to about one hundred pounds per person per year, and in Italy only thirteen pounds per person per year is used.

Those who have had the opportunity to examine the mouths of Italians and Greeks and some other European races will testify to the beautiful teeth and the freedom from decay that the children and grown-ups show.

Much is being done in this country by physicians and our Government to teach the people that sugar has a food value, and while this is true of natural sugar such as is found in fruits, etc., it is extremely doubtful if the opposite is not true when applied to free sugar. I would advise every one to carefully read Dr. Fones's remarks upon this subject which are published in the April, 1920 number of the *Dental Cosmos.*

Fruits, nuts, whole-wheat bread, cereals, milk and cheese are all good wholesome foods and should be advocated at all times.

In conclusion, permit me to emphasize the newer and greater importance of dentistry of the present day, and this is:

First, the importance of the hygiene of the mouth in relation to nutrition and food value.

Second, the importance of prophylaxis as conserving the integrity of the teeth and the health of the soft tissues.

Third, the importance of prophylactic fillings as a preventive measure against decay.

Fourth, the importance of appreciating our responsibilities because of the great benefit we can give mankind.

Fifth, last, but not least, the splendid opportunity offered us to take the leading part in the next great advance in preventive medicine.

PREVENTIVE DENTISTRY*

BY D. R. DUDLEY, D.D.S., MOUNT AYR, IOWA

AS A PROFESSION we have accomplished wonderful results in the treatment of diseases, in artistic fillings and the making of crowns and bridge work. Yes, fillings that do not stop decay, crowns that do not fit, bridges that smell to Heaven, and with it all we have only made a mere patch. Did you ever think of this, that the most beautiful gold restorations, fillings and inlays, porcelains and synthetics are just at best only patches, and who of you would not rather have a whole garment than one that has been patched, a perfect tooth than one that has been filled or crowned?

At home I have two girls, one twelve years old and the other one five. Now I want to ask each one of you here, if I put these girls in your hands to take care of their teeth until they are twenty years old, what can you promise me when you give them back to me? A devitalized tooth or two, with perhaps two or three crowns, and when you put the crown on you let the stone touch the adjoining tooth, so there will be several approximal fillings and maybe a small bridge? Or will you positively assure me that, barring accidents, you will turn these girls back to me with a perfect set of teeth, with the teeth all polished so smoothly they couldn't decay, and the gum tissue so pink and hard that they are beautiful to see? I am sure you all want your own children to have that kind of teeth.

Now, how are we going to take care of these patients so we can absolutely promise them an immune mouth if they follow our directions?

The first thing that probably would do the most good would be eugenics, and let us hope that the day is not far off when we will all know more about it and laws will be passed that will make it practicable. But as that is impossible just now we will pass that and take up something that is within the reach of all of us.

I read in one of the dental journals a short time ago, that ninety-eight per cent. of the children in the public schools had bad teeth and that by proper care and feeding we could eliminate ninety per cent.

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*Read before the Southwestern Iowa Dental Society, 1920.

of that decay. It has long been known that privations in certain articles of diet caused certain diseases. It has been shown that defects of the structure and arrangement of the teeth are as much under the control of the dietitian as bodily growth itself. Teeth can be developed defective or sound, regular or irregular, at the will of the dietitian. More than this, teeth may be decayed, or, though defective, can be prevented from decaying at the will of the dietitian and the dentist. When we have definite knowledge, so we can give definite instructions to the parents of the children, so the diet will remain normal at the time when the new teeth are being formed, there is no limit to the amount of good we can do.

In an article in *The Dental Cosmos* for August, 1920, Percy R. Howe, chief of the research laboratory of the Forsyth Dental Infirmary for children, says:

> "I have been able to produce what I believe to be true decay in teeth of animals by feeding diets that are deficient in respect to the food accessory substances. By feeding young guinea pigs diets that consisted mainly of fat free milk and rolled oats with as little as possible of foods containing the food accessory elements, and continuing this over a considerable period, I have been able to produce caries and irregularities. In one young pig for example, the lower incisors decayed first and broke off half way to the gums; later the other incisor decayed and also broke. By careful feeding of food containing the proper elements I was able to arrest the carious and softening process and in time the animal began to gain in weight and to eat quite well." He also said as yet he didn't know which one of the vitamines produces the effect, but would discuss that in a later paper after making more experiments.

Let us hope the time is not far off when we will all be able to give our small patients a diet that will make good teeth along with strong bodies, as with definite knowledge, definite instructions can be given to parents; and I am sure, judging from the number of mothers that ask me what to feed the children to make good teeth, they will take it up and follow our instructions. They have accepted prophylaxis, dental fillings and the tooth brush, tooth paste and powders as the dentists' prescription for the prevention of caries, so I believe they will take up diet when we can give them something definite.

The next step in preventive dentistry and the one that we can all take, is prophylaxis. I realize that the great majority of the dental profession prefers to do what they call the more expert mechanical work, such as gold fillings, inlays and bridge work, that they think requires greater skill; but what I term "prophylaxis" is not simply cleaning and polishing the teeth but putting the whole mouth in perfect condition; and when you realize that the shape of every tooth, every contact point, every incline plane is necessary to good occlusion in the absence of which the teeth are driven outside their normal limits of motion and subjected to a lateral strain, which if long enough continued results in definite changes in the pericementum and alveolar process with a coincident loosening of the teeth, then you realize that real prophylaxis takes all the skill we have.

What good are you going to do your patient if you make the most beautiful gold or porcelain restoration and in a short time the patient loses that tooth from pyorrhea? The whole dental profession has not been alive to its responsibility in this important feature of dental practice. Diseases of the dental investment affect the very foundations of the dental arch. To construct beautiful restorations as is being done everywhere, and place them in teeth, the supporting tissues of which are involved in disease, is like building a house on the sand. That the supporting structures of the teeth must be maintained in health if the teeth are to be preserved and that no art, however perfect it may be, will avail anything, is a truth we must all recognize.

I hear someone say, "I don't bother with prophylaxis; I let the dental hygienist do that." How many of you, if you will stop to think a minute, will say that any young woman can learn to put a mouth in perfect condition in six months, the usual length of the dental hygienist course? I don't believe it can be done. The only way in which the dental hygienist can be of help to you is to work right along with you. What good can she do a tooth if it has a filling in it that is not the right shape?

I also hear someone say: "She can take care of teeth all right that don't have any fillings in them," but can she? A man came to me a few days ago with as perfect a set of teeth as you ever looked at, but he complained of food crowding between the second bicuspid and first molar on the lower jaw. Now what did I do—cut a cavity in those beautiful teeth and fill to make a tighter contact? No, never. I ground the occlusal planes so they would throw those teeth back and make a tight contact.* Could your dental hygienist do that? I don't believe you would want her to try it in your own mouth. So I say, that the dentist should do the first work of putting the mouth in perfect condition himself; then it is well enough to turn the patient over to the dental hygienist and have it understood that if the gum tissue does not stay perfectly healthy you should see the patient and remove the cause.

The most important question to me is this: Will my patients' mouths be in as good shape ten years from now as they are today, or will they have a few more fillings, a crown or two more than they have now, or perhaps have lost all their teeth and be wearing plates? For that reason I am trying to learn more about tooth-form, so that when I make restorations I can put that tooth back to as near normal as possible, so the food will pass off in the right relation to the gum tissue, and make the occlusal planes so they will not move the teeth. Then the contacts will remain correct.

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*Would not that process open up a space on the other side? The question is an important one, and THE SUMMARY would like to have it worked out to a practical conclusion.—EDITOR.

The mouth must be examined thoroughly and the treatment of each tooth undertaken seriously and systematically, with the training of the patient in intelligent care of the mouth and finally subsequent observation to insure against relapse.

The treatment consists in thoroughly cleansing the subgingival space in its entirety about every tooth. Having explored each subgingival space and carefully removed the contents, the teeth should be smoothed and then polished. I am sure if each one of you would examine carefully with a magnifying glass the teeth you extract, you would realize better how rough the teeth are and especially at the gingiva. I first scale the tartar; then to smooth the rough enamel I use any instrument that I can reach it with the best, scalers, pyorrhea planes and stones of different grits; then to polish I use svelto paste with strips, brush wheels, rubber cups, wood points with jigger and hand instrument. The important thing is to keep at it until it is well done. For the final polish I use Carmi Lustro on leather wheels. I know it is a lot of work and takes much time, but after you get it done the patients like it and most of them get very enthusiastic about it as you would yourself if you had yours treated likewise. The dentist spent seven hours on mine, and I really think it is the best seven hours I ever spent, as I know now my teeth won't decay if I do my part and keep them brushed properly.

After the teeth are in shape, the mouth should be examined for open or defective contact points, overhanging edges of fillings, ill-fitting crowns, bridges, etc., and when these are present, steps should be taken to correct them, for they are among the principal causes of gingival irritation. In a word, the mouth should be viewed in its entirety and the patient be made to understand that the health of the mouth as a whole depends upon careful attention to all these details, and that you cannot be held responsible if they are unwilling to follow your advice. Then he must be told what his part consists of, and it must be given the same systematic care that is given to the case by the dentist.

Before any instruction is given, careful inquiry should be made of the patient to ascertain his habits of mouth-care. This should include inquiry regarding the form of tooth brush, kind of dentifrice, frequency, the way in which they are used, etc. Having learned these facts one is in a position to advise what changes are necessary, and there are few cases where a more or less complete change will not be found to be desirable. The first requisite is a small tooth brush of good quality, with each tuft of bristles separated. I have the patient get the hard brush, and get three or four, so they can salt them good after using one and let it dry before it is used again. In this way you insure a hard brush and one that if well salted is sterile. Dentifrices of known composition should be prescribed, not for their therapeutic value, for they probably have none, but because of their abrasive and cleansing effect.

Having provided the patients with the necessary instruments for the proper care of the mouth, the next and most important step is to instruct them in their use. There is a diversity of opinion regarding the best method of tooth brushing but we are all pretty well agreed on one point, that horizontal or cross brushing has no place in the care of the mouth. That leaves the vertical, or by a combination of vertical and horizontal strokes, the rotary method. Personally this is the one I prefer as I think the patient will stimulate the gums better with it than with the vertical motion, and as long as we are going to mash, grind and cook every mouthful of food we eat, we need stimulation and must get it with the tooth brush. I usually demonstrate in my own mouth how to do it; and then when the patients come back for inspection, I brush their mouths for them to show them just where to brush and how to get into each space, as you will find very few patients who will get over the whole mouth thoroughly. There will be some places they miss; but after you brush their mouth for them and explain why it is so important to touch every surface of the teeth and gum tissue and thoroughly stimulate it, they get interested and will work hard to follow your instructions.

In closing, I wish to repeat that in childhood and youth the great problem of the dental profession is the treatment of the individual patient for the prevention and cure of caries, rather than the repair of damage which has been caused by caries. The fundamental problem is not what should be done with the pulpless tooth, but how can the exposure of pulps be prevented?

If I have said anything in this short paper that will make one man here go home and do a thorough prophylaxis on one of his own children, I will feel repaid for writing it, as I know if he does it once for his own child, that child will have better teeth when he is grown and in that way the dentist will be convinced and do more of it for his patients.

CORRELATIONS BETWEEN NEUROPSYCHIATRY AND DENTAL PATHOLOGY*

BY DR. LOUIS E. BISCH, ASHEVILLE, N. C.

SEVERAL MONTHS ago a married woman of thirty-five was referred to the writer with these symptoms: Paroxysms of pain along the right facial nerve, which usually began as an indefinite dull ache somewhere in the right jaw and would gradually become more and more severe. Occasionally exacerbations of a sharp lancinating character also occurred. The pains often radiated into the back of the neck and down the spine, and sometimes the right leg was involved. At other times the pain started in the neck, and the facial involvement seemed to develop afterwards. The paroxysms occurred fairly regularly—every ten days. They would last about three days, completely prostrating the patient, and although many drugs had been used at various times, morphia would often be the only remedy to bring relief. These symptoms had been existent for twelve years.

The patient, during all these years, had had many examinations and the physical side was negative, including laboratory tests on the blood and spinal fluid, except for a slight uterine misplacement, which was not thought to have a direct bearing upon the malady. Brain tumor had also been suspected, but in the absence of focal symptoms and negative eye grounds, this was ruled out definitely.

After additional repeated examinations and a few days of observation, which carried the patient over a period of an acute attack, the diagnosis soon narrowed itself down to two possibilities:

Either an hysteria of long standing operating through subtle, unconscious mental mechanisms to justify drug addiction—for she was a high-strung, unstable, introspective and egocentric type, and had taken quantities of narcotics for the pain; or a neuralgia, which must be secondary to some organic cause at that time unknown.

Since the second possibility seemed more concrete and tangible, and since, furthermore, one should never make a diagnosis of a functional nervous disease until all organic factors have been eliminated, it was decided to review previous findings and to examine most carefully the oral cavity.

A surgeon-dentist was then called into consultation, and he found a small flap of mucous membrane which looked as though it had been cut obliquely with a sharp instrument, and which fitted so neatly and snugly on the inner side of the jaw, about an inch above the right first molar, that only a most painstaking search revealed its presence. A probe inserted into this slit was readily admitted into the antrum, and upon withdrawal showed the presence of thick, foul-smelling pus.

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*Read before the North Carolina Dental Society, 1919.

Later, a radiograph of this region clearly demonstrated the stump of this first molar, which had been left behind after an extraction over twelve years ago, and before the onset of the neuralgia, and the pus pocket around it had spread and involved a large area of caseous disintegration of the antrum floor.

To conclude the story, the dentist operated, removed the stump, curetted the antrum clean, and in a month the woman was cured.

Another case in which conditions were reversed is interesting here. A man in the early fifties had been under treatment by a dentist for several months. The symptoms were similar to those of the patient just described; in other words, a right-side, facial neuralgia. However, the paroxysms of pain were more acute, were confined to the face, subsided in a day or two, and were often followed by weeks of freedom from symptoms of all kinds.

Many dental procedures had been carried out on this patient, including drainage of pus pockets, scarification of granulomata, root-canal fillings, etc. Besides, and apparently out of desperation, most of his teeth—some of them perfectly sound and healthy—had been extracted. Nevertheless, despite all this attention, the neuralgia persisted.

Here, then, was a case which had first gone to the dentist and all organic factors had been ruled out. Because of a general anxiety reaction which the patient showed and a typical neurotic make-up, the writer soon was able to make a diagnosis of a psychoneurosis. A course of treatment by psychoanalysis relieved the man of his symptoms.

These two cases in the neurological field are cited to illustrate the purport of this paper. In the former the neurologist calls the dentist to his aid; in the latter, it is the dentist who refers to the neurologist.

The secondary systemic effects of focal infection in the jaws has been stressed so much in recent years that the relationship existing between distal root decay and infections of the heart, kidneys, and other organs of the body, is now common knowledge. In fact, it seems to be becoming a routine precedure for dentists to refer all such cases to the general practitioner for the presence of a possible endocarditis and an examination of the urine for albumen. What I would like to bring out, however, is that similar important correlations exist between dentistry and neuropsychiatry.

Perhaps least emphasis, so far as these correlations are concerned, has been placed upon the functional nerve diseases—the neuroses and the psychoneuroses. And in this connection the entire mouth area deserves special emphasis because its importance in mental analysis cannot be overrated and its very definite interest to the dental profession goes without saying.

For the preservation and continuance of the race, nature is primarily concerned with nutrition and reproduction. The child soon learns to suckle the mother's breast and the resultant satisfaction of hunger and the direct stimulation of the taste buds and sensory nerve receptors in the oral cavity, including the lips, establishes at once an area of pleasure to which psychoanalysts have given the name "erogenous zone." In other words, an erogenous zone is an area which, if stimulated, gives pleasurable satisfaction. Other erogenous zones are also established early in infancy, but our special interest here is a cursory consideration of the mouth zone. Later on in life, when the sex organs begin to call for recognition, the mouth erogenous zone gradually takes a place of secondary importance to these organs, or, perhaps, let us say, it becomes a nutritional area more intimately linked with the sex or reproductive area, and we find then that kissing, for example, which is an excitation of the mouth zone, arouses sex desire.

Unfortunately the limits of this paper do not permit me to go into detail concerning this interesting theory of biological progression, and I would refer my readers to current works on psychoanalysis. Suffice it to say, however, that closely interrelated and intricately interwoven with this physical erogenous zone of the mouth are multitudes of mental correlatives. Wherefore it follows but logically that in patients with functional nervous diseases, such as the last one given, where the mouth area presents symptoms, and who often go to the dentist for relief, the cure frequently lies in mental therapy in cooperation with dental treatment. And another point may be added. It is that a neurosis may be co-existent with dental pathology and the symptoms be aggravated because of it, while, on the other hand, dental pathology may, if allowed to remain uncorrected, be the means of preventing the complete cure of a neurosis by analytic methods.

Another subject in which the dentist and neuropsychiatrist have mutual interest is that of the feebleminded—especially in reference to the problem of orthodontia.

To be sure, the term "feeblemindedness" is generally used very loosely, and as such includes all grades of mental defect, even to definite amentia as distinguished from mere retardation. But when we reserve the term "feeblemindedness" to mean only congenital mental subnormality, due to inherent, organic defective development of cerebral neurones, the following investigations are noteworthy:

In 1897, Dr. Walter Channing* published a paper entitled, "The Significance of Palatal Deformities in Idiots." After studying one

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*Reported by Dr. Milo Hellman, New York City, in discussion of writer's paper, "Diagnostic Methods in Determining Feeblemindedness," read before the Eastern Association of Graduates of the Angle School of Orthodontia.—*The Dental Cosmos*, May, 1917.

thousand feebleminded individuals and five hundred normal school children, he concluded thus:

First, two-fifths of the palates of idiots are of fairly good shape.

Second, palates of normal individuals may be deformed.

Third, in idiots it is a difference in degree and not in kind.

Fourth, in either case it shows an irregular development anatomically.

Fifth, palates of average children and idiots under eight years of age probably do not, in the majority of cases, markedly differ.

Sixth, there is no form of palate peculiar to idiocy.

Seventh, the statement that a V-shaped or other variety of palate is a "stigma of degeneracy" remains to be proved.

Dr. Clark Wissler, of the American Museum of Natural History of New York, amplified these findings later on by a further study of a large number of models of both normal and abnormal individuals. He concluded that in the feebleminded the growth of bony structures in the mouth is completed somewhat earlier than in the normal, and, therefore, since the complete growth of the palate occurs sooner than in the normal, it does not proceed harmoniously with the eruption of teeth. In consequence, the teeth become crowded and the result is a larger percentage of irregular and misshapen teeth in the feebleminded than one finds in the normal. His conclusions were that the general type of the palate, as defined by measurements taken, is the same in the feebleminded as in the normal individuals.

Nevertheless, despite these scientifically conclusive findings, when we deal with the question of mental retardation as distinct from feeblemindedness, we have a field in which productive work has already been done by the dental profession.

By mental retardation is meant a slowing-up of nervous and mental processes, due to some physical handicap, which acts with the same results as does a brake on an automobile. These children and young adults are born normal and possess all faculties intact. Their potentials for development are normal also. Yet, as they grow older, some handicap appears which both delays and interferes with normal development.

Among those which are seen by the dental diagnostician are: Deformities in the shape and size of the cranium; of the nose, lips, and tongue; saddle and V-shaped palate; small, receding, or large, projecting jaws; malformed, irregular and misplaced teeth; drooling from the mouth; and delayed primary or secondary dentition.

Such physical handicaps, if corrected, often are followed by a speeding-up of the mentality, to say nothing of the correction of faulty mastication, digestive disturbances, toxic status, etc., which usually follow.

It is this type of case that often comes to the dentist long before it is brought to the neuropsychiatrist. It is also in these cases, where cooperative checking-up can so well be established by means of the various mental tests given for retardation, that definite, tangible results can be watched so easily and followed up for scientific purposes.

Here, then, are a few thoughts suggestive of the manner in which dentistry and neuropsychiatry can work hand-in-hand. Each is a specialized science, and mutual cooperation between the two broadens the vision and is conducive to scientific advancement.

THE RETENTION OF FULL UPPER AND LOWER DENTURES*

BY RUSSELL W. TENCH, D.D.S., NEW YORK, N. Y.

A MAJORITY of our profession look upon the problem of constructing full upper and lower dentures, which will prove efficient, comfortable and satisfactory to their patients, as most vexatious. That this is so must be attributed largely to the fact that but few operators have a proper conception of the factors that govern the success or failure of their prosthetic efforts; many go about their work blindly, trusting largely to luck and the laboratory to rescue them from a bad situation, hoping that time and a kind Providence may come to the rescue by adapting the patient's mouth to their dentures, and knowing that after a time, becoming wearied, many patients will endure anything. Efficiency is often totally ignored. The easy way is followed and sometimes achieves an apparent success.

It takes but very little more time in the aggregate to construct wonderfully efficient dentures that may be worn without soreness or discomfort to the patient immediately, or within two weeks after the day they are adjusted to the mouth, than it takes to travel the usual road of hasty, imperfect methods, dissatisfaction, complaints and adjustments to the point where the patient is said to be satisfied or, more aptly, resigned to fate.

The difference between dentures that satisfy and the other kind may all be summed up in the phrase, "knowledge skillfully applied." To possess knowledge requires patient, thoughtful study. To acquire any degree of skill requires that the operator be willing to practice, to try and to try again and again patiently and with the exercise of the faculties of self-control and reason till the problem involved is mastered. It is useless to try to do a thing that cannot be done—to waste effort. But that which is being done by many can be done again by any one who has the will, desire, inspiration or whatever you may choose to call it, to keep everlastingly at a thing till he learns to do it.

I make these assertions because I know that a small proportion of the dental profession attempt to excuse themselves from performing the best service for their patients, by saying that the patient will not pay for the highest type of denture service, that the time required to become reasonably proficient in the methods that are being advocated for the construction of the highest type of dentures is too great. They cannot afford it; why bless you, the reason they cannot afford it is because they won't try it. For myself there is no satisfaction in trying to do anything but the best that is possible for any patient, and I cannot bring myself to sympathize with those who would adopt a quick method or an easy method which I know in my heart is not based on principles that will make it the ultimate, the best, when carried to completion. There can be no higher professional precept than to do unto others as you would that they should do unto you.

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*Read before the North Carolina State Dental Society, 1919

The factors that we must understand and know before any technic of impression taking can be brought to its greatest possibilities of perfection may be resolved into two groups, viz., those that tend to displace dentures, and those that assist in retention. There are two groups of forces that may act on a denture, either singly or together. One group helps to hold the denture in place and the other group tends to force it from its seat on the ridge. When the forces that seek to unseat the denture are just balanced by the forces that tend to retain the denture the denture will "stay put." If we know what the displacing factors are and the limitations of these factors, we may maneuver so that these forces may only act weakly on the denture or assist in retaining it. Then having a full knowledge of the retaining factors we may utilize them to the fullest and thereby render a truly professional service to our patient which cannot help but redound to our own benefit in lessening our worries and in making possible a more professonal remuneration.

Preparatory to taking up the study of the retention and displacement factors just mentioned, let us consider that a denture consists of two parts, one which we will call the base and define as that portion of the upper denture that is in intimate contact with the alveolar ridge and hard palate and part of the soft palate, and that portion of the lower denture that covers the alveolar ridge. Superimposed on the base is the dental arch, which is that portion of a denture that holds the teeth and attaches them to the base.

The pressure exerted by the atmosphere in which we live is the most important single factor with which we are concerned in a study of the problem of denture retention. The retention of our denture will be good or bad in direct ratio to our utilization of this important factor. The measure in which we are able to utilize atmospheric pressure is determined by the adaptation and extension of the base of the denture in question.

Extension, as we will consider it, deals with the area that the denture base covers. Maximum extension is required if maximum retention is to be obtained. The larger the area that a denture can be made to cover, the greater the force the atmosphere can exert on it, hence the greater resistance it offers to displacing forces. A denture has reached the point of maximum extension when the peripheral portions of its base reaches to, or in some cases very slightly beyond the point of attachment of muscle fibers that bound it.

It is important to realize that full extension is necessary. Just at the point of muscle attachment the oral tissues are usually somewhat soft and thick, and at this point they must be slightly compressed to form a valve that will yield to the movement of the denture without allowing air to penetrate under the base. If this rule is not followed the displacing factors will usually overbalance the retaining factors with sad results. Very few dentures are made today which measure up to this rule. Uppers are turned with a pencil or a file largely under the guidance of fancy. Lowers are made too short and too narrow.

A second point about maximum extension worthy of consideration is, that the force of mastication is distributed over a large area and patients can employ full muscle tension when necessary to masticate hard or tough foods without discomfort.

A denture base that is intimately adapted displaces air, the weight of which exerts pressure of about fifteen pounds on every square inch of base area. The denture is literally floated into contact with the mouth tissues by the weight of the air that it displaces. Let the adaptation of the denture at its periphery be slightly imperfect, letting air leak into and fill the denture till it sinks in the air as a boat filled with water sinks in the water. Under such circumstances the denture, if it is an upper, will drop; if it is a lower it will bog around loosely in the mouth as the patient talks or eats. This illustration may seem a little academic and far-fetched, but it will serve its purpose if I can convince you that it is the pressure of the atmosphere that retains dentures. No mention has been made of vacuum, which I have intentionally ignored, because dentures can be made to resist displacement to a greater degree without so-called vacuum chambers or suction devices than is ever possible with them; also, because when you use the term suction, meaning the creation of a vacuum more or less complete, you are simply saying in another way the pressure of the atmosphere. To understand the foregoing statement is to divest the problem of retention of some of the mystery that has for a long time surrounded it. When a vacuum chamber or a relief is made in a denture, a certain amount of air is retained under the denture, and air being slightly compressed as the denture is seated exerts its expansive pressure and has a tendency to balance the external atmospheric pressure and decreases the amount of force required to displace the denture in mastication. I do not mean here to imply that a relief is not a good thing; it is necessary, but so-called suction chambers are much less potent in retention than extension and adaptation. Relief is often necessary to secure adaptation. Perfect adaptation of a base, no matter of what material it is made, is largely a matter of accident if it is attained. That this is so is largely due to expansions and contractions of the metals used in constructing metal bases, and to the same phenomena in rubber or combination rubber and metal, or metal and porcelain dentures. The imperfection of materials of which denture bases may be constructed makes it very important that we use the greatest care in all stages of denture work; that we pay every attention to securing accuracy in every detail of our work to the highest degree possible.

Minute imperfections in adaptation are overcome to a great degree by saliva and the action of capillary attraction and adhesion which hold it interposed between the denture and the mucosa, in which position it acts as a seal to keep air from penetrating under the denture. Some of us, when we have been a little too careless in our technic, have errors which even saliva will not save us from, and we resort to a thicker medium for this purpose which has to be sifted on to the denture from a can, but which lacks the advantage that saliva possesses of being replenished automatically.

The quality of adaptation and the selection of an impression material with which to obtain the best adaptation depends very largely on the condition of the mucosa covering the ridges.

Opposed to the force of atmospheric pressure and the correlated factors that make possible the maximum degree of retention are certain other factors arising from the force of muscular contraction. These factors may be grouped and called displacement factors. Their action is largely opposed to retention, and a successful denture must utilize enough of the possibilities of the retention group to offset all possible strain imposed by the displacement group; and at the same time the forces that may cause displacement must, if possible, be prevented from acting to displace the denture or be used to aid in its retention. Leverage enters largely into the consideration of this phase, and where its action is unavoidable it should be allowed to act on the upper rather than the lower denture. In all instances leverage must be reduced to the minimum permitted by esthetics, if the greatest permanence of results is expected.

The contractile force of muscle tissue acts on the periphery of the base of both the upper and lower dentures and through the dental arch.

If the base of the denture is permitted to extend beyond the point of muscle attachment to the palatal or buccolabial borders of the upper denture, a strain is created which may be sufficient to displace it. If this result is not apparent in a few days it may develop in a month or two. If the denture is retained in spite of this error soreness will result and trimming is made necessary.

To avoid displacing muscle strain and soreness the upper denture should end posteriorily at the point where the soft tissue flexes when the patient says "Ah." When the tissue covering the mouth is thick and soft or when the anterior ridge is flabby, the upper denture may safely terminate anywhere up to one-eighth of an inch posterior to this point of flexion.

The lower denture rests on a moving support, and the resulting muscle pressures are much more potent in displacing it if they are not avoided. On the lingual side of the lower ridge the periphery of the lower base should rest snugly against the tissues at or about one millimeter below the mylohyoid ridge. Impressions will invariably extend from one-eighth to a half-inch below this point and must be trimmed to the proper outline to secure the best suction. A properly-taken impression will be perfectly trimmed for the *frenum linguæ*. The buccolabial flanges will require to be trimmed to the point where a vertical pull on the muscle of the lip or cheek will not unseat the denture.

Muscle contractions act on the dental arches through the bolus of food during mastication, and when their force is magnified by leverage due to incorrect design of the arches the efficiency of the dentures is greatly impaired and often entirely destroyed. By setting the lower teeth directly over the lower ridge, and as close to the ridge as ethetics will permit, the stability of the lower denture is greatly increased. Taken bucco or labiolingually the center of any given lower tooth should be directly above the middle line of the lower ridge. When the lower teeth are placed in this manner the tongue is allowed ample room, and the buccal and labial muscles are prevented from exerting dislodging pressure on them in either speech or mastication. The objection may be raised here that upper teeth will be set an unnecessary distance outside of the ridge, due to the fact that the lower ridge is usually considerably larger than the upper. This is so, but the area of the upper affords greater possibilities for retention and the upper denture rests on an immovable supporting member which more than offsets any increased leverage caused by setting the upper teeth outside of the ridge when this is necessary.

220 W. 42nd St.

LATE RESULTS OF TREATMENT OF GUNSHOT FRACTURES OF THE MANDIBLE

WITH SPECIAL REFERENCE TO VARIOUS METHODS OF BONE GRAFTING*

BY ROBERT H. IVY, M.D., D.D.S., PHILADELPHIA, PA.

THIS PAPER is based on data furnished by the Office of the Surgeon-General and by personal communications from officers in charge of maxillofacial cases at the different army hospitals designated for the treatment of such injuries on return of the wounded to the United States. It is an attempt to give a combined survey of the end-results of the various methods of bone grafting employed for the cure of nonunion with loss of substance following gunshot fracture of the mandible in the American Expeditionary Forces.

It is impossible at present to state accurately the number of gunshot fractures of the jaw bones occurring in the American Expeditionary Forces, but it is possible to reach an approximate estimate. We know that fractures of the jaws constituted about two-thirds per cent. of all gunshot wounds in the late war. The total number of wounded in the American Expeditionary Forces was about 225,000. Two-thirds per cent. of this yields 1,500 gunshot fractures of the jaw bones.

In about three-fourths of these cases the mandible is involved, while in one-fourth the maxilla is affected. So that, assuming a total of 1,500, 1,125 would be fractures of the mandible and 375 of the maxilla.

We have fairly accurate records that in the neighborhood of 600 patients with gunshot fracture of the jaw bones required further hospital treatment after return to the United States. The great majority of these patients were treated in certain hospitals where special personnel and equipment were provided for the care of maxillofacial injuries. The hospitals and surgeons in charge of this work were: U. S. Army General Hospital No. 2, Fort McHenry, Md., Lieut-Col. George C. Schaeffer; U. S. Army General Hospital No. 11, Cape May, N. J., Major George M. Dorrance; Walter Reed General Hospital, Takoma Park, D. C., Lieut-Col. Robert H. Ivy, and later Lieut.-Col. Jay D. Whitham; U. S. Army General Hospital No. 40, St. Louis, Lieut.-Col. V. P. Blair and Major Frank J. Tainter. Later the Post Hospital at Jefferson Barracks, Mo., replaced General Hospital No. 40; and Post Hospital, Columbus Barracks, Ohio, replaced General Hospital No. 2. At present the cases still remaining under army treatment are at Walter Reed General Hospital, Jefferson Barracks and Columbus Barracks.

Of the 600 cases of gunshot fracture of the jaw bones requiring hospital treatment after return to the United States, 445 involved the mandible and 155 the maxilla. In thirty-six cases both upper and lower jaws were involved.

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*Read before the Section on Stomatology (A.M.A.), of which by special arrangement THE DENTAL SUMMARY is the representative organ for the dental profession.

TABLE 1.—SITES OF FRACTURE

In four hundred and forty-five mandibular cases.

	Number	Per Cent.
Body	230	51.7
Symphysis	76	17
Angle	53	12
Ascending ramus	31	7
Alveolar process alone	14	3.1
Condyle or coronoid	7	1.8
Multiple	34	7.6
Total	445	

Of 445 cases of gunshot fracture of the mandible retained in U. S. Army hospitals for treatment 322, or 89 per cent., of the American Expeditionary Forces total secured bony union without bone graft, leaving 123, or 11 per cent., of the total resulting in nonunion or vicious union, and requiring bone graft. In two of these cases of nonunion the patients refused operation.

TABLE 2.—FRACTURES OF JAW BONES IN AMERICAN EXPEDITIONARY FORCES

Total gunshot fractures of jaw bones in A. E. F. (estimated)		1,500
Maxilla	375	
Mandible	1,125	
Total gunshot fractures of jaw bones requiring care in U. S.		600
Maxilla	155	
Mandible	445	
Total mandibular fractures securing bony union without graft	322, or 89% of A. E. F. total.	
Total cases of nonunion or vicious union requiring grafts	123, or 11% of A. E. F. total.	
Total number of bone grafts to date		103

Up to the present date, 103 bone grafts have been made or have come under observation at the hospitals named. Cases of vicious union with loss of substance as to require bone grafting were comparatively few, probably not more than twelve in all. This was because most of the cases received early and constant attention in the form of reduction and fixation with respect to proper occlusal relationship of the upper and lower teeth. In other words, collapse of the fragments to close the space due to loss of substance was not permitted, a nonunion with good occlusion being regarded as a lesser and more easily corrected evil than firm union in bad position. The almost universal preservation of good occlusal relationship in these cases, and the exceptionally large percentage of good functional results in cases cured without bone grafting are principally due to the efficient and painstaking work of the dental officers.

METHODS AND RESULTS

The methods of bone grafting employed will not be described in detail. The technic is given in the various references mentioned.

The results with the different methods employed are recorded as successful, partially successful, and failures. By a successful result is meant complete restoration of continuity of the bone. By a partial success is meant union of the graft at one end only, in which a further, supplementary operation was necessary. By failure is meant loss of the graft from suppuration or absorption.

First, Pedicled Graft from the Mandible Itself—This method was first described by Cole,[1] and has also been the subject of a paper by Tainter.[2] Here a piece of the lower border of the anterior fragment is removed, with a pedicle of digastric muscle and fascia attached to it below for nourishment. This is carried back to fill the gap and fastened to the ends of the fragments by means of silver wire. This form of graft is satisfactory in cases of loss of substances up to three cm. in the body or symphysis of the mandible. It is not applicable when the ramus is involved. It has the advantage of furnishing a piece of bone that has not been cut off from its blood supply, and is therefore not so vulnerable to infection as the free graft.

This form of graft showed the best results on the whole, namely, thirty-one cases, twenty-seven successes, three partial successes and one failure (successes, eighty-seven per cent.). It must be remembered, however, that this method was used principally in cases of comparatively small loss of substance, in which the ramus was not involved. It is my experience that regeneration does not occur nearly as readily in the region of the ramus as in the body and symphysis.

Second, Osteoperiosteal Method—This graft[3] consists of a thin shaving of bone from the surface of the tibia together with the overlying periosteum, which is laid in two or more pieces between and in contact with the ends of the fragments. It is suitable for loss of substance of any extent, and in any position, and the technic is simple. Thirty-eight patients were operated on by this method, with twenty-seven successes (seventy-one per cent.), three partial successes and eight failures.

Third, Free Graft from Crest of Ilium—This has been the method of choice of Gillies and his associates at Queen's Hospital, Sidcup, England, and I have already described it.[4] The graft consists of a piece of bone, the full thickness of the crest of the ilium, beginning at the anterior superior spine. It is adapted either to a small or a comparatively large loss of substance. It is especially suitable in cases in which immediate rigidity is desired, namely, when too much dependence cannot be placed on splints for fixation, and also for an immediate cosmetic result when the loss of substance has produced much visible deformity.

Only seven grafts have been made from the crest of the ilium, five, or seventy-one per cent. being successful, one partially successful, and one lost from suppuration. The series is too small to form a basis for comparison.

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[1] Cole, P. P.: Brit. J. Surg. 6:57 (July) 1918.

[2] Tainter, F. J.: United Fractures of the Mandible Treated by Bone Graft, J. A. M. A. 73: 1271 (Oct. 25) 1919.

[3] Delagenière :Bull. et mém. Soc. chir. de Paris, May, 1916; Lébédinsky and Virenque: Prothèse et chirurgie cranio-maxillo-faciale, Paris, 1918.

[4] Ivy, R. H.: Ann. Surg. 71:363 (March) 1920.

TABLE 3.—TYPES OF GRAFT AND RESULTS

Type of Graft	Successful	Partially Successful	Failures	Doubtful	Total
1. Pedicled graft from mandible	27 (87%)	3	1	..	31
2. Osteoperiosteal from tibia	27 (71%)	3	8	..	38
3. Crest of ilium	5 (71%)	1	1	..	7
4. Cortex of tibia	11 (65%)	1	2	3	17
5. Rib	6 (100%)	..	..	..	6
6. Ramus sliding	2	..	1	..	3
7. Ox-bone	..	..	1	..	1
Total	78 (76%)	8 (7.7%)	15 (13.5%)	3	103

Fourth, Free Cortical Graft from Tibia—In this method the technic of Albee was generally followed. Of a total of seventeen cases, eleven, or sixty-five per cent. were successful, one was partially successful, two were failures, and in three the result is still in doubt owing to the short time that has elapsed since the operation.

Fifth, Free Rib Graft—Only six patients were operated on by this method, all being successful. The series is too small, however, to form a basis of comparison with other methods.

Sixth, Ramus Sliding Graft—I am unfamiliar with the technic of this method, but assume that it is a modified pedicled graft in cases of involvement of the ascending ramus. Of three cases treated in this way, two were successful and one a failure.

Seventh, Free Ox-Bone Graft—One case in which this operation had been performed at another hospital came under observation at the Walter Reed General Hospital several months later. There was nonunion at one end, and evidence that absorption was going on in the transplanted bone. It would appear from recent experience that there is little use for anything but an autogenous graft.

Of a total of 103 graft operations, seventy-eight, or seventy-six per cent. are recorded as entirely successful. Partial success was attained in eight, or 7.7 per cent.; in three the result is still doubtful, while the failures numbered fourteen, or 13.5 per cent.

Comparative figures of the three methods most commonly employed are distinctly in favor of the pedicled graft with eighty-seven per cent. successes, as against seventy-one per cent. for the osteoperiosteal method, and sixty-five per cent. for the cortical tibial graft. However, elimination of cases of the two latter types, in which a pedicled graft would not have been indicated, might materially change these deductions.

A DENTAL CLINIC FOR CHILDREN IN A SETTLEMENT*

BY HAIDEE WEEKS GUTHRIE, D.D.S., NEW ORLEANS, LA.

THE FIRST DENTAL CLINIC for children in a settlement was established in the New Orleans Dispensary for Women and Children. The clinic is for the poor without regard to race, creed or color. The clinic is now caring for 1,500 children in the immediate neighborhood, and others between the ages of two and eight years from all parts of the city and adjoining parishes. The clinic is able to do this because of the excellent cooperation of the social service workers, who gather the children from the neighborhood and return them at stated times for necessary treatment and examination. Kingsley House is our first settlement house, and the dispensary is in the settlement.

The New Orleans Dispensary for Women and Children is a fifty-bed hospital. We have seven allotted beds in the children's ward, and at times have taken care of thirty-five children. The nurse is charge of the children's ward is punctilious in the care of the mouths of the children. The children are given regular and systematic care of their teeth with a tooth brush, which is of a size adapted to each mouth, a point very often overlooked. Physiologic solution of sodium chlorid, for a wash, is used after each meal and at bedtime.

This report is based on the case records of more than 8,000 children. In point of age, the patients ranged from infancy to the sixteenth year.

The data collected showed the age, sex, race, nutrition and the history of previous infections. The grade in school and whether or not the child was a "repeater" were also recorded. The number of deciduous and permanent teeth present, as well as the existence of cavities, abscesses or sinuses, and their location, were noted in every case.

Special dyscrasias, when existent, were also noted, as well as abnormal frenum, fifth cusp and geographic tongue. Roentgen findings and the results of Wassermann reactions were also recorded when these examinations were made.

So far as the social workers were able to observe them, a marked reduction in the number of cases of infectious diseases occurred in the children who "belonged" to the clinic. There has not been an epidemic in this neighborhood since the clinic was started.

Two special groups of children were studied: one group known to be tuberculous and one made up of proved subjects of syphilitic infection. These were observed to determine the value of thorough dental care in these conditions. In the tuberculosis group, ninety-five per cent. of the deciduous teeth had to be removed before the eighth year, on account of abscesses. In the syphilitic group, only forty per cent. had to be removed. More cases of retarded absorption of the deciduous roots and later eruption of the permanent teeth were noted in the syphilitic group than in tuberculous. In nine cases of the sixty, at the thirteenth year, I had records of roentgenograms made to determine the condition of the deciduous roots. The roentgenograms disclosed a beginning absorption. In these nine cases the ten deciduous teeth (right and left upper and lower, first and second deciduous molars) were extracted, first on one side, upper and lower, and then, in about six weeks, on the opposite side. In a few months the permanent teeth were erupted in correct position.

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*Read before the Section on Stomatology (A. M. A.), of which by special arrangement THE DENTAL SUMMARY is the representative organ for the dental profession.

Ulcerative stomatitis occurred with greater frequency among the children who came from the parochial (religious) schools. These patients were all isolated in the hospital and treated on the basis of using bactericidal measures directed against an anærobic organism. No deaths occurred; several cases of marked deformity, as the result of extensive operative procedure necessary to get rid of the infection, resulted.

In cases of ulcerative stomatitis, it is our practice to substitute a dichloramin-T solution in water, 1:1,000, for the physiologic sodium chlorid; and a mixture of potassium chlorate, dilute hydrochloric acid and glycerin is given internally, every two hours, with a nourishing diet.

We find more of these cases during the months of January and February, following the usual winter diseases in this climate, when the resistance is low and there has been poor or very scanty nourishment and no mouth hygiene. In eighty per cent. of these cases there was great loss of both hard and soft tissue. Our cold weather begins in November and December. The infections which are continued through six winter months in the children in a more northern climate are experienced by our children during only two months, November and December. The children lack the necessary green vegetables and fruits during these months, and the milk is less rich and more expensive. There is a relative deficiency of fat-soluble A vitamins and water-soluble B vitamins during these months. This, while not producing actual lesions of scurvy, certainly is a factor in bringing about an impairment of nutrition sufficient to account for the diminished cell resistance, a predisposing cause, at least, of the more extensive ulcerative processes we see during the winter months.

On one occasion, a child of foreign-born parents was confined to the hospital with a mouth infection, and on my next visit to the ward, I found *all of the children* in this family, three in number, all under eight, in the children's ward, where they had been sent by their parents—"a fine place to stay." The parents knew the children would be well fed and cared for, and would be out of their way during that time. It is surprising how many times the mother will bring the child to the clinic and ask whether they could be left for treatment. There is no horror in the mother's mind of this neighborhood clinic or of the hospital.

Acute abscess in the sense that is conveyed by the use of this term in dental literature was never seen in this series. Undoubtedly there must be an acute phase of the lesion; but evidently the subjective discomfort at this stage does not bring the child to the dentist. In the child, the peridental membrane really exists as a definite structure differentiated from the bony walls which support it. Later, it takes on a bony structure by the migration of bone cells into the stroma and becomes itself truly bony.

TABLE 1.—ERUPTION OF THE BICUSPID

Age	No. of Bicuspids	Cases
6 years	1	134
7 years	1	49
7 years	3	133
8 years	2	236
8 years	3	240
9 years	7	131
9 years	8	336
10 years	8	29
Total Cases		1,288

The question of the absence of acute abscess in the child's mouth has given rise to much thought and study. Why do we not hear the child crying and screaming with the pain in the *deciduous* teeth, as we do with the pain in disease of the first permanent molar? We encounter acute abscess and toothache in the first molar. In the child under six, we often find a swelling, pus and perhaps a sinus before the child has given any sign of inconvenience.

TABLE 2.—ERUPTION OF FIRST MOLAR

Age	No. of Molars	Cases
3 years	4	1
4 years	1	11
4 years	2	12
4 years	3	1
4 years	4	13
4½ years	1	11
5 years	1	214
5 years	2	211
5 years	3	168
5 years	4	212
6 years	4	434
Total Cases		1,288

The variation in structure and progressive hardening of the peridental membrane is probably the explanation of the variation in the occurrence of acute abscess in childhood as contrasted with the more advanced years. Apparently it is only after fistula, sinus or free pus discharge is established that the child comes for help.

In seventy per cent. of the cases the tooth may be saved between the fourth and sixth year, by forcing a saturated solution of silver nitrate through the root and sinus, followed by formaldehyd solution, and sealing with gutta-percha for two weeks. Sometimes it takes two months of treatment, but we have maintained the tooth in usefulness for four or five years. Following the abscesses of the deciduous molars, it is surprising how quickly the bicuspid erupts. For example, a lower right first deciduous molar abscessed at the age of five years. It was treated after this plan, cured (roentgenographed many times), and filled with amalgam. After two years, that patient, now aged seven years, came with tooth loose and was roentgenographed again. The roentgenogram revealed completely absorbed roots, and a perfectly formed bicuspid erupted. At the age of ten, the patient still has eleven deciduous teeth, the last roentgenograms showing very little absorption of the deciduous roots (another syphilitic case).

Following these abscess conditions we have a rapid absorption of the deciduous tooth and a correspondingly rapid formation of the permanent tooth. The irritant which stimulates the osteoclasts in the absorption of the deciduous tooth also stimulates the osteoblasts in the formation of the permanent tooth. These conditions we find between the ages of three and five. If these teeth are erupted in infancy earlier here than in a more northern latitude, the earlier eruption time may account for the earlier decay.

The eruption of the bicuspid furnishes striking record of the earlier development in New Orleans.

The study of the eruption of the first molar is interesting. In New Orleans, we cannot call it the six-year molar. Its eruption is from eight to twelve months earlier here than in the Northern states.

An appreciation of the principles of the child's psychology is fundamental in this work and more or less difficult to formulate. Results are absolutely predicated on an understanding existing between the one who is charged with the work and the patient. Here, more than in other fields, discipline is essential.

Success in the management of a child's dental clinic depends also on securing the return of the child regularly for inspection and treatment, if treatment is needed. The child must feel that the clinic exists for him and that he has become a member of the organization. The feeling of mutual interdependence can be achieved best by placing the clinic near the child's home. It should become a necessary part of his life, and he must feel that he must attend as he attends school or church. A location near his home makes easier the task of the social worker and really economizes the time of the dentist.

Without the lessons in prevention and instruction to the children in prophylaxis and without the close liaison that has been possible through the location of my own clinic near to, and in cooperation with, Kingsley House, the social service center of the neighborhood, my own task would have been beyond my power to perform.

1206 Maison Blanche Building.

A BRIEF PROFESSIONAL SUMMARY AND OUTLOOK*

BY DR. T. O. HEATWOLE, BALTIMORE, MD.

DENTISTRY as a science is rapidly coming into prominence as a distinct branch of the healing art. The advancement made during the past five years alone justly entitled it tc a claim to progressiveness, and has served to break down the barriers which have hitherto limited the scope and possibilities of our field.

We stand today at the threshold of a universal recognition of our services to humanity, such recognition coming from the National Government, the general public, and the parent healing art scientific body—the medical profession. With such an array of backing, the dental profession may safely feel that its place in the civilization of a country has been definitely and undeniably won.

The Government has evidenced its faith in our calling through legislative provision, whereby dentists have been called into the Army and the Navy service as such, and given rank and opportunity for promotion. It is unquestionably true that the recent war has afforded the profession opportunities and means of placing itself on a footing which would have taken many, many years to acquire otherwise. How well our Dental Corps measured up to the requirements is left for history to record, but, if we may base an opinion on the reports of those best advised by reason of close contact with men of our specialty during the conflict, we may be justified in the prediction that a full and complete history of the activities and good results of the work of the Army and Navy Dental Corps will compare favorably with any other department of the service; if not, give grounds for general satisfaction and even pride in professional achievement. It has certainly proven its worth, and will continue as an important and essential arm of Government service in the future.

Coexistent with the recognition coming through Government service, the general public was informed of the new phase of health conservation as applied to the fighting forces of this country by means of a discussion of the subject in the press. State and municipal health authorities are everywhere convinced of the need for more attention being given to the mouth and its continued parts as a prophylactic measure in the line of preventive medicine. Being advised of these matters through such sources, the public has been awakened to the importance of our work, and at the present time it is safe to say that, collectively speaking, the profession is as busy in its activities as any other set of men engaged in the line of professional public service. Indeed, it may truthfully be said that as a whole it is an overworked profession at this particular period.

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*Read before the North Carolina State Society, 1919.

Men of the highest standing in medicine have placed their stamp of approval on the needs of the public for a better study and application of mouth hygiene. Recognition by them of the untoward results arising from areas of focal infection in and about the mouth has served to stimulate a closer relationship between the members of the allied professions, and we now find them collaborating in their efforts in service to humanity. Through their conjoint work along these lines it has been clearly demonstrated that many of the systemic diseases, formerly attributed to varying causes, are directly traceable to neglected conditions of the oral cavity. Today the most expert and experienced diagnostician is not willing to hazard an opinion as to the underlying cause of obscure cases until he has before him the report of a reliable dentist covering a thorough and complete study and opinion of the tissue conditions embraced within this particular field.

At this period the practice of medicine is pretty thoroughly departmentized, and our branch is the latest acquisition to the rather long list of specialties, such as surgery, stomach, eye and ear, nose and throat, heart and lungs, genito-urinary, obstetrics, psychiatrics, etc. With all of these the general diagnostician is more or less familiar, but will often refer his patient to one or more specialists as a matter of verification. When it comes to the teeth, his hands are practically tied, owing, no doubt, mainly to the fact that he has been educated *away* from them rather than *in* these important organs which play a big part in the health and happiness of the individual. Doubtless his education long ere this would have included a mastery of this regional subject, except for the fact that dentistry as a separate and distinct profession sprang into existence more than three-quarters of a century ago. That the medical profession has remained aloof on this phase of medicine is a compliment to the dental profession, and demonstrated rather conclusively that the field has been satisfactorily handled in the light of prevailing knowledge and conditions up to the present era.

On superficial thought it may appear strange that the two professions, medicine and dentistry, moving along independently, and in accordance with separate and distinct ideals for so long a period of time, should see their efforts and purposes converging, even coordinating, if not amalgamating, in the service both are rendering humanity. However, a closer study of the cause and effect producing this happy result is readily explained when we remember that science, real science, leads only to one end—*truth.* Viewed from this angle, it is not in the least surprising that we find the two professions joining hands in correlated endeavor in their efforts to relieve suffering and teach the people themselves preventive medicine. The pity of it is that such gratifying and helpful relations could not have come about earlier. Failure to do so is perhaps chargeable to a hitherto more or less faulty scientific basis on which we attempted to build. Let that be as it may, the fact remains that promise of the future to the profession and the public is good to contemplate, because, in the light of a better understanding of each other, and the interdependence of both, we may be assured of the strictest application of all phases of science in the alleviation of disease conditions to which human flesh is heir.

Some years ago Dr. Charles Mayo, a surgeon of national reputation, gave out a statement to the medical profession which amounted to a challenge to the dental profession when he said in substance, "The next great advance in medicine must be made by the dentists," and then followed this up with the inquiry, "Will they be able to meet it?"

Within very recent times General John Pershing, when placing a wreath on the tomb of the illustrious LaFayette, said much in few words, and expressed succinctly a nation's sentiments by the use of one short sentence, "LaFayette, we are here." The challenge of Mayo above referred to may be answered in Pershing style, with modifications to meet the circumstances, by saying, "Mayo, we are coming."

The factors which have operated in giving us grounds for claiming growth and general fitness to meet the test of conditions are doubtless too near at hand to be especially noted by the casual observer. Therefore, it may not be amiss to recount these influences, even at the risk of being regarded as dealing with subject-matter familiar and within the knowledge of all. The prime object in summarizing these forces is to give the profession generally a clear insight, if possible, into the combined factors, making it possible to develop in as rapid a manner as has been our good fortune during the past five years.

Possibly no one feature has stood out more strikingly as an advance movement by the profession than the growing tendency to specialize. Men with unusual talents for particular lines have perfected themselves in the technic of various departments, and thereby developed highly-efficient attainments in a chosen branch of work. The liberal and broad-minded attitude of the profession is to be commended in that these men with specialties are very generously accorded their deserved rights and claim of better and more efficient service because of experience and concentration of effort. The general public has been educated to the point of valuing the specialists in any line of endeavor. It is probably not saying too much when we express the opinion that the specialist in dentistry has forged the link which brought medicine and dentistry into an appreciation of their helpfulness to each other. Without going into the merits and possibilities of individual cases, you are advised to recall in your own mind the opportunities for consultation with medical practitioners by the orthodontist, exodontist, pyorrhea specialist and prosthodontist. As is the case with experience in all matters, these men can claim, and do command, better fees for their services, and for the very good reason that such service is worth more to the individual.

A failure to include post-graduate work as an important element in the uplift of the profession would be an oversight, since men everywhere are giving of their time and money each year in order to keep abreast of the progress being made by the stronger members of our calling. This is sometimes accomplished through State associations, themselves arranging for a series of courses to be presented by men peculiarly fitted for the work. This policy is highly commendable and can result only in great good, if properly handled. Another phase of post-graduate work going on in the larger centers of population, and of which slight notice has been given, is the numerous study clubs in existence and scattered all over the country. Most of these organizations are composed of small groups, numbering from eight to ten men. Probably the majority of these units take the appellation of "Black's Study Club," as a compliment to our deceased benefactor, Dr. G. V. Black, who labored incessantly during a full lifetime to place dentistry on a scientific basis. The inspiration of his example, writings and teachings has been caught up by a later generation, and his work is being carried forward in the interest of the profession and the public. It would prove enlightening to know the total number of men in the United States who are represented in these units at this time. With such information at hand, it is safe to predict that a fuller appreciation of the part they have played in the broadening process would become much more noticeably apparent.

The establishment of a dental research department and the splendid scientific work it has done has been another big factor in giving impetus to the upward trend of the profession in recent years. This department, growing out of the National Dental Association, and the journal published under the auspices of the same, provided the means for spreading broadcast the call for higher service, and has shown the way to a larger field. No practitioner can afford to hold himself aloof from these powerful and helpful influences. To ignore them is to stamp the individual as being out of touch with the central propelling force around which is revolving the many associated by subsidiary activities of helpfulness.

Great inspiration has come to us through the establishment of such monuments as the Forsythe and Rochester Dental Institutes, and, while they serve local communities directly, their influence is making itself felt in all sections of the country. The day is not far distant when other large centers of population may imitate the bold and rational movement along philanthropic lines taken by those whose generosity made it possible to give to the people and to the profession these pioneer institutions. The investment of large sums of money, such as was required for buildings, equipment and maintenance of these institutions, shows an abiding faith in the efforts made by dentists in the past, and also proves that, in the minds of men of affairs, there exists an impression that a great work can be accomplished by the profession, if given proper help and encouragement.

In line with the above enumerated advanced processes, the schools of the country have attempted to keep pace with the times by adding an additional year to the curriculum, making it a course of four years instead of three. The wisdom of this policy has already justified itself, although the new regime has been in effect for only two sessions thus far. The extra time makes it possible to give more attention to scientific subjects, to technic, and also assures better training in fundamentals. The future product of the schools should give promise of a continuation of the momentum now in progress, if not aid greatly in assisting the movement, once these men enter the profession.

EPITHELIAL INLAYS VERSUS SKIN OR MUCOUS MEMBRANE FLAPS FOR REPLACING THE LOST MUCOUS MEMBRANE IN THE MOUTH*

BY GEORGE M. DORRANCE, M.D., PHILADELPHIA, PA.

THE TITLE OF MY PAPER is misleading. I have no desire to start a controversy over the methods employed in restoring lost mucous membrane in the mouth, but I wish to point out some of the reasons why epithelial inlays are indicated in the treatment of injuries and disease.

As a preface to my remarks I would say that almost every case requires modification of any method adopted. In the early days of the war, the epithelial inlay was not used. As a matter of fact, the method was not described until the year 1917; hence the skin flaps and mucous membrane flaps were used in every case for the restoration of lost mucous membrane. Many surgeons, having success with this method, continued to use it, but it is interesting to note that the surgeons attached to the English centers were quick to adopt the epithelial inlay as part of their armamentarium for replacing mucous membrane.

The surgical text-books describe in detail the indications and technic for the restoration of the mucous membrane in the mouth by the use of skin flaps and mucous membrane flaps. Some of the contraindications to their use are not sufficiently emphasized. There is no question that in restoring mucous membrane when the area involved is so situated that it has sufficient adjacent mucous membrane for the making of the mucous membrane flap, this method is the one of choice. In cases in which there is not a sufficient amount of mucous membrane, one may increase it by freeing the mucous membrane at the site of the scar tissue.

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*Read April, 1920, in the Section on Stomatology (Amer. Med. Asso.), of which, by special arrangement THE DENTAL SUMMARY is the representative organ for the dental profession.

It will be observed that there is a slight proliferation of the mucous membrane for weeks or months following, because of the tendency of the membrane to roll out. This process may be aided by the use of Bier's hyperemia cups.

In mucous membrane flaps, it is essential that the mouth be placed at rest in the open-bite splint, the latter having a movable bar to which modeling compound can be attached. After freeing the area to which the flap is to be applied, a model is taken in the compound and attached to the rod in order to hold the flap under pressure and in perfect apposition with all parts of the cavity. It is the same surgical principle as is used in the case of the Wolf graft. The flap must be kept in apposition to the area that is to be covered. The flap or graft will always take if held under pressure.

It is difficult at times to estimate just how much contracture may occur in the site from which the flap is taken. If the surgeon feels that there is a possibility that contracture will occur in the area on which the flap is to be taken, I would say that the epithelial inlay should be used in preference.

Skin flaps unquestionably have considerable value in restoring great defects. The objection to them, however, is that they are all bulky and do not make the perfect mucous membrane. The skin flaps as a rule must be selected from a hair-bearing area. The tendency for the hair to continue growing in the mouth is a great source of annoyance to the patient. The use of the roentgen-ray to destroy the hair follicles is of some value, but is not a sure method. If it is necessary to use a flap from a hair-bearing area, the hair should be destroyed before the flap is made.

The epithelial inlay differs from the mucous membrane flap in that it has a tendency to contract. There is no way of preventing this except by keeping up the pressure for a long period of time. I have described the technic of the epithelial inlay heretofore.[1]

In the Maxillo-Facial Service of U. S. Army Hospital No. 11, at Cape May, N. J., I used the method employed at the Queen's Hospital, Sidcup, England, but found it necessary to introduce several minor modifications.

First, we dissected out the scar tissue, enlarged the cavity much beyond what was desired, and then put the jaws in an open-bite splint. The advantage of the open-bite splint is that it keeps the mouth in one position—in the overcorrected one—preventing interference with the final result by subsequent contracture.

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[1]. Dorrance, G. M.: Am. Surgery 65:297, 1917.

Second, we retained the original compound in place for from fourteen to twenty-one days, and followed its removal by the insertion of a vulcanite model which was held in position for several weeks. The graft should never be sutured over the compound, as it defeats the object desired; that is, the compound is only supposed to hold the graft intact under pressure against the raw surface. The point to be remembered is that the compound should be held in place under pressure. If any of the graft extends over the normal mucous membrane, it does not do any harm.

While most of my experience with the use of the epithelial inlay has been in cases following war injuries, I am fully convinced that it holds a very important place in civil surgery.

CONCLUSIONS

The mucous membrane flap is indicated when it is possible to obtain such a flap without producing subsequent contracture over the point from which the flap is taken.

Epithelial inlay should be used in restoring mucous membrane when it is difficult to obtain a mucous membrane flap.

Skin flaps can be used to advantage in covering large defects.

2025 Walnut street.

ADDENDA TO DENTISTS IN HOSPITALS, PUBLIC CLINICS AND MEDICAL COLLEGES

BY H. L. AMBLER, IN NOVEMBER, 1920, DENTAL SUMMARY

Dr. Will H. Whitslar, of Cleveland, has been giving lectures annually at the Fairview Park Hospital Training School for Nurses, on anatomy, physiology, pathology and hygiene of the mouth.

This is the fifth year of this service and is the only hospital in Cleveland presenting a complete course of instruction of this nature.

In addition to the list of dental appointments in hospitals published in the November, 1920 SUMMARY, I have additional information to submit. In November, 1917, a Dental Service was established at the Cleveland City Hospital and attached to the Department of Surgery. H. C. Kenyon, D.D.S., was, on November 15, 1917, appointed Visiting Dental Surgeon and has since been actively engaged in filling that position and is a fully recognized member of the Visiting Staff which directs and supervises the House Staff. In February, 1918, M. J. Cramer, D.D.S., was added to the Visiting Dental Staff as Visiting Dental Anesthetist. Carl Brown, D.D.S., holds the appointment of Resident Dental Surgeon for this year and is the most recent of five successive appointees to that position. Among the others are C. H. Scheu, D.D.S., of Lakewood, and C. A. L. Lyons, D.D.S., of Tiffin, Ohio.

Beginning with February, 1921, the Dental Service at this hospital will be raised to the grade of a department under the title of Department of Dental Surgery, with Dr. H. C. Kenyon as Department Head and Visiting Dental Surgeon; Dr. M. J. Cramer as Visiting Dental Surgeon and Assistant Department Head, and Dr. Carl Brown as Resident Dental Surgeon.

This department has an out-patient dispensary service in Oral Surgery for patients referred from the dental dispensaries of the city.

H. R. C. Wilson, D.D.S., for the last six years has been secretary-treasurer of the Cleveland Mouth Hygiene Association, and since January 19, 1921, a director of the association, which was granted a charter on this date, and now has one chair at Health Center No. 2, at 502 Central Avenue; one chair at Health Center No. 6, corner St. Clair and 102nd St.; three chairs at No. 7, 6100 Pear Avenue, completing about one hundred and fifty cases per month, mostly for children. Dr. Wilson is responsible for the Babies' Dispensary and Hospital Clinic, where there is one chair, and he is looking after one Industrial Clinic at the Kaynee Blouse Co., Etna road; he also gives lectures for the Mouth Hygiene Association at parochial schools; the above clinics and lectures are supported by the community fund through the Welfare Federation, which appropriated $19,430 for the 1921 budget; the doctor is secretary of the Cleveland Dental Library Association.

Very truly yours,

H. L. AMBLER.

Rose Building.

REPAIRING PORCELAIN FACING ON GOLD CROWN WITHOUT REMOVING CROWN FROM TOOTH

BY S. ROBERT WATSON, D.D.S., HENDERSON, N. C.

(FOR THE DENTAL SUMMARY)

This method is very simple and short. Cut out the labial surface of the crown so that very little gold will show, leaving enough, however, for strength across the incisal edge and just a little at the gingival margin. Cut into the tooth material, if there is any, so as to give a little more depth, making slight undercuts under the edge of crown. Now fill with synthetic porcelain and dismiss the patient and polish at another sitting. A new crown may be made, cut out, finished, cemented to root or tooth, then the cement removed from the labial open surface and filled with synthetic porcelain as above.

I have had some very pleased patients after operating in this manner.

FUNDAMENTALS OF OPERATIVE DENTISTRY

BY W. H. O. McGEHEE, M.D., D. D. S., CLEVELAND, OHIO

LATE PROFESSOR OF OPERATIVE DENTISTRY, DENTAL PATHOLOGY AND THERAPEUTICS, AND SUPERINTENDENT OF CLINICS IN THE DENTAL SCHOOL OF WESTERN RESERVE UNIVERSITY.

DISEASES OF THE PULP

GENERAL CONSIDERATIONS—CLASSIFICATION—TREATMENT OF VITAL PULPS

NO ATTEMPT is made in this work to enter into an extended discussion of the causes and pathology of diseases of the pulp, these considerations being more appropriately confined to texts on dental pathology. It is, however, necessary for an intelligent study of the contents of the following chapter, to briefly outline certain phases of the subject. Neither will the therapeutic aspect of these diseases be extensively discussed, this lying more appropriately within the province of works on dental therapeutics. The various technical and operative procedures will, however, receive due attention, and a detailed description of them will be offered.

GENERAL CONSIDERATIONS

The pulp is situated in the pulp chamber and canals, and sends out from its odontoblastic layer numerous prolongations, the dentinal fibrillæ, these penetrating the dentin to the dental-enamel junction, and in some cases entering the enamel. The enamel is a low conductor and, under normal conditions, acts as a protective covering to the pulp and the dentinal fibrillæ, preventing the contact with and the transmission of sensations of heat and cold, electricity and chemical substances. When the enamel is intact and the pulp healthy, the tooth is not sensitive to ordinary variations in temperature, the application of a very mild electric current, or the presence of the chemical substances frequently found in the mouth (sweets and acids). If, however, through the action of caries or other pathologic disturbances, the enamel be lost and the dentinal fibrillæ be subjected to the action of these agents, they soon become abnormally responsive to them, transmitting the sensations to the pulp, which soon becomes over-stimulated and irritated, resulting in a diseased condition of its substance.

From a pathologic standpoint, diseases of the pulp are usually affections of its vascular system, due to over-stimulation of the sensory and vasomotor nerves of the part. They are also largely progressive in character. If the conditions mentioned in the preceding paragraph receive early treatment, the resultant fullness in the arteries of the pulp (arterial hyperæmia) be relieved, and the lost enamel and dentin be compensated for, by the application of a non-conducting filling, the pulp usually may be permanently restored to its normal state. If, however, the above condition be allowed to continue untreated, the increased supply of blood in the arterial system of the pulp becomes dammed back into the veins of the part, and venous hyperæmia results, with the escape of the lymph and red corpuscles. This condition supervening, finally results, on account of pressure and consequent rupture of the vessels, in the passage of the red and white corpuscles and platelets into the interstices of the pulp tissue, so that a condition of inflammation is established. When venous-hyperæmia or inflammation is present, the only alternative is the destruction and removal of the pulp.

If the condition be still further neglected, pus-forming microorganisms, constantly present in the mouth and in the blood streams of the body, make their entrance into the pulp tissue, with the result that pus formation occurs (suppuration), or the death of the pulp is finally accomplished through the process of putrefaction, with the formation of malodorous gases (putrefactive decomposition, or moist gangrene). If, however, germs do not enter, the pulp will die a natural death from lack of nourishment (its blood supply being interfered with), and the condition of dry gangrene is established. In all of these disturbances there is always the possibility of the pathologic condition extending through the apical foramen, with the resultant production of disease processes in the tissues of the apical space and, if germs be present, the formation of an alveolodental abscess. (Septic apical pericementitis).

The diseases of the pulp mentioned above are progressive in character and may now be briefly described as follows:

First, arterial hyperæmia. An increased supply of blood in the arteries of the pulp, resulting in over-fullness and distention of these vessels, with consequent pressure on the sensory nerves of the part, and resultant pain.

Second, venous hyperæmia. The blood becomes dammed back into the veins, with the production of the same condition in these vessels, increased pain from pressure and passage of lymph and red corpuscles into the interstices of the pulp.

Third, inflammation. The pressure in veins and arteries results in their rupture and, in addition to the preceding complications, the passage of the white corpuscles through their walls into the interstices of the pulp, resulting in the tissue changes characteristic of inflammation in other parts.

Fourth, suppuration. The blood corpuscles and the surrounding pulp tissue are broken down, liquefied and transformed into pus, through the action of germs, which have entered by way of the blood stream or the pulp chamber and canals.

Fifth, moist gangrene (Putrefaction). The blood current becomes stagnant and finally ceases, on account of the pressure in the vessels passing through the minute apical foramina. Death of the tissues occurs from lack of nourishment, purtefactive decomposition and destruction occurring through the action of putrefactive germs, with the formation of malodorous gases and highly-infective irritating products.

Sixth, dry gangrene. Germs do not enter, death of the tissues occurring without suppuration or putrefaction, from strangulation and lack of nournishment. The pulp remains in a hard, dry, shrivelled condition.

Seventh, alveolar abscess. The putrescent material infects the tissues of the apical space, with resultant pus formation, breaking down and destruction of these parts.

CLASSIFICATION OF DISEASES OF THE PULP

Diseases of the pulp may be *classified* as follows, viz.:

First, Vital Pulps:

- *A* Arterial Hyperæmia: Pulps capable of being restored to the normal condition.
- *B* Venous Hyperæmia: Pulps incapable of being restored to the normal condition.
- *C* Inflammation: Pulps incapable of being restored to the normal condition.
- *D* Suppuration: Pulps incapable of being restored to the normal condition.

Second, De-Vital Pulps (non-vital)*:*

- *A* Dry Gangrene: Pulps uninfected.
- *B* Moist Gangrene: Pulps in a state of putrefaction and infection.
- *C* Alveolar Abscess: Pulps with apical complications.

TREATMENT OF VITAL PULPS

Avoidance of pressure important. In cases of exposure (a minute opening through the wall of the pulp chamber), the vital pulp rebels against the application at the point of exposure of the slightest amount of pressure, so that during the treatment of these conditions, great delicacy of touch and the absolute avoidance of pressure is essential.

Aseptic precautions essential. Owing to the fact that the saliva and the decay present in cavities is highly infected with germs, whenever an exposure of the pulp occurs, these germs enter the pulp chamber and infect the pulp tissue, producing a septic condition of the part. The pulp is probably infected, then, in all cases of pulp exposure. There is also a possibility of these germs entering to the pulp through the layers of dentin in the floor of cavities, at the necks of the teeth, and through cracks in the enamel, by way of the dentinal tubules, even in those cases in which the pulp is not exposed. In the conditions of suppuration and moist gangrene, highly infective micro-organisms are always present. Consequently, it becomes necessary, in treating these conditions in the mouth, to adopt measures to prevent, as far as possible, the entrance of these germs, by absolutely and permanently excluding the saliva from the cavity, and by sterilizing all instruments and appliances used; or, in case the germs are already present, to destroy them by the application of antiseptics and germicides. In the following pages these measures will, for the sake of convenience, be designated "aseptic precautions."

CONSERVATIVE TREATMENT OF THE PULP

By conservative treatment is meant the institution of measures intended to maintain or restore the pulp in or to a normal condition. The character of the procedure depends on whether the decay, when present, has extended to the pulp chamber, constituting the condition known as exposure of the pulp, or whether it has not produced this condition. There are, then, two forms of conservative treatment. If the pulp be not exposed, the treatment applied is known as *Pulp Protection;* if the pulp be exposed, the operation of *Pulp Capping* may be resorted to, under certain circumstances.

462. Describe the operation of *Pulp Protection.*

Under "aseptic precautions" establish the outline form of the cavity, remove the decay, make slight retentive form, and seal into the cavity with base-plate gutta-percha or cement, a small pledget of cotton moistened with an antiseptic and anodyne, such as eugenol or oil of cloves.

At the end of twenty-four or forty-eight hours, if pain is relieved, remove the dressing under "aseptic precautions," varnish the walls of the cavity, place a cement intermediate in position and fill.

463. Mention the *Indications for Pulp Capping.*

The indications for the operation are accidental exposures, teeth with incompletely-formed roots, and very badly broken-down teeth, otherwise impossible to save. In all of these, the condition of the pulp must not have passed beyond the stage of arterial hyperæmia, since it is usually impossible to restore pulps to a normal condition which have progressed beyond this stage.

464. *What Conditions Affect the Success* of the operation?

The condition of the pulp, condition of the mouth, age, and physical condition of the patient. Pulps should not, as a rule, be capped, if they have passed beyond the stage of hyperæmia, and even this should first be relieved. Pulp capping operations usually are contraindicated in unclean mouths and in the mouths of patients suffering from lowered vitality or systemic derangements interfering with the circulation; also in old patients whose recuperative powers are low.

465. What *Precautions* are necessary to successful pulp capping operations?

First, relief of hyperæmia.

Second, sterilization of the field of operation.

Third, avoidance of pressure.

466. Mention the *Substances Recommended* for capping pulps.

A thin paste composed of one of the following substances or mixtures, viz.:

First, thymolized calcium phosphate and clove oil, eugenol or phenol compound (Buckley).

Second, zinc oxid and clove oil.

Third, chloro-percha.

Fourth, paraffin (melted), or paraffin and salol.

Fifth, zinc oxysulphate cement.

Sixth, jodo-formagen cement (composition, phenol, eugenol, formaldehyd and iodin salts).

Of these, the author usually prefers the first two mentioned.

467. Describe the *Technic* of the operation of *Pulp Capping*.

First, spray the mouth with an antiseptic, apply the rubber dam and flood the cavity with an antiseptic.

℞ Phenolis	ʒ I
Aquæ menthæ piperitæ	ʒ VI

Misce. Sig. Use wherever a mild, non-irritating antiseptic is indicated. (Buckley).

Second, establish the outline form and remove the decay.

Third, seal into the cavity for a week, an anodyne, antiseptic preparation, for relief of hyperæmia, pain and irritation. Phenol compound (Buckley), eugenol, clove oil, campho-phenique and Black's 1-2-3 are all recommended.

The formula of phenol compound is as follows:

Menthol	gr. XX
Thymol	gr. XL
Phenol, (U. S. P.)	ʒ III

Heat the phenol and carefully add the others. (Buckley).

Fourth, tease over the point of exposure and floor of the cavity, without pressure, a small amount of the capping material, mixed to a creamy consistency; cover, and fill the cavity with a creamy mix of oxyphosphate of zinc cement, and allow to remain for six months to a year, when, if the pulp has remained quiet, the outer layer may be removed and a permanent filling inserted. Some operators prefer to carry the capping material to, and hold it over the exposure, with a concavo-convex metal disk of gold, platinum or German silver, in order to avoid pressure. The cap may be obtained ready prepared, or it may be cut and swaged on a soft block of wood to the proper shape and size. In the majority of instances it is not necessary.

468. What are the *Advantages* in maintaining the *Vitality of the Pulp?*

First, avoidance of root-canal work and of the danger of infection in the apical space arising later, from imperfect-canal operations.

Second, the pulp is the organ of nourishment for the dentin, and when it is removed, the tooth is more subject to pathologic processes.

Third, when the pulp is lost, the enamel becomes more brittle and subject to fracture and decay.

Fourth, caries, arising later in the tooth, progresses more rapidly in non-vital dentin, because of loss of its normal vital resistive powers.

RADICAL TREATMENT OF THE PULP

By radical treatment of the pulp is meant the extirpation and removal of the pulp after it has been previously anesthetized or devitalized.

The following conditions frequently necessitate the removal of the pulp:

First, venous hyperæmia, inflammation, and invasion of the pulp by pathogenic micro-organisms, as a result of caries and similar conditions.

Second, mechanical irritation from abrasion, thermal changes, metallic fillings, rapid regulation, excessive grinding, and similar causes.

Third, calcific deposits in the pulp, or on the walls of the pulp chamber.

Fourth, crowning and extensive filling operations, where additional anchorage is required, or proper preparation cannot otherwise be accomplished.

Fifth, pyorrhea alveolaris, where additional anchorage for splints is desired, where the pulp is diseased, or where the affected teeth are hypersensitive.

The conditions essential to a successful result in the removal of pulps are:

First, establishment and maintenance of asepsis.

Second, preservation of the color of the tooth.

Third, thorough opening and filling of the canal.

The various methods used for the painless removal of the pulp are: Pressure anesthesia, the high-pressure syringe, cataphoresis, conductive anesthesia, application of nervocidin, or devitalization, after which the pulp is extirpated.

The use of the high-pressure syringe has been quite largely abandoned. The Meyers and the Jewett-Wilcox were prominent forms of syringe for this purpose. The method was used where there was no exposure present. It may be briefly described as follows: *First,* drill an opening as close to the pulp as possible, with a half millimeter round bur, enlarge it and countersink it with a No. 1 round bur. Insert the *flattened* end of the needle of the syringe, which should exactly fit the opening drilled into the dentin, to prevent backward flow of the solution, and slowly and forcibly inject through the dentinal tubules into the pulp, a novocain or cocain solution, which will anesthetize the pulp. If the pulp is not desensitized by the first injection, drill closer and repeat the procedure until the desired result is obtained.

The cataphoric method of removing pulps is very little used at present, owing to the time required. By means of the cataphoric apparatus, an electric current, slowly and gradually increased in voltage, forces the anesthetic solution through the tooth structure into the pulp. The small platinum electrode (positive pole) is placed in contact with the novocain solution in the cavity, and the negative electrode is placed over the gums or other part of the body. The current is then slowly and gradually increased, thus driving the anesthetic solution into the pulp.

Anesthetization by nervocidin consisted in sealing into the cavity a small amount of nervocidin for twenty-four hours, when the pulp was anesthetized and painlessly removed. This drug is a derivative of gasu-basu, a plant found in the East Indies. Its use is practically abandoned for this purpose.

Sterilization of the Cavity before pulp removal is important, because it is necessary to avoid infecting the pulp and apical tissues during the subsequent procedures. In addition to the application of the dam and sterilizing agents, all instruments and appliances should be sterilized. Coagulating agents, such as phenol, should be avoided for sterilizing cavities, preceding the operation. Use for the purpose a ten per cent. solution of formalin, one to five hundred solution of mercuric chlorid, twenty-five per cent. solution of sulphuric acid, or sodium dioxid. Grieves has recently recommended for this purpose one part beechwood creosote in ten parts clove oil, sealed into the cavity for two or three days preceding the operation.

469. Describe the operation of *Devitalization of the Pulp*.

A Under aseptic precautions establish the outline form, remove the decay, and make the cavity slightly retentive, avoiding pressure on the pulp.

B If the pulp is aching, place gently over the exposure a pledget of cotton saturated with an anodyne, such as eugenol or oil of cloves, and seal (avoiding pressure), with base-plate gutta-percha or cement, allowing it to remain for from twenty-four to forty-eight hours.

C Remove the dressing under aseptic precautions, and gently place directly over the exposure, or slightly to one side, with a pair of dressing pliers, a small pledget of cotton, or piece of asbestos, on which has been placed a minute amount of arsenical paste.

D Seal, avoiding pressure, with gutta-percha or cement, and allow to remain from one to seven days (usually twenty-four to forty-eight hours), at the end of which time the vitality of the pulp is destroyed, and it may be painlessly removed. (*Extirpated*).

470. By whom was *Arsenic Trioxid* first introduced and for what purpose?

Dr. Spooner, of Montreal, in 1836, used it for relief of hypersensitive dentin. It was later found that death of the pulp had occurred, necessitating its removal, when the agent was then advocated for devitalizing purposes.

471. *Give some Formulæ for Devitalizing Pastes.*

℞	Arsenic trioxid	gr. XV
	Cocain hydrochlorid	gr. XX
	Thymol	gr. V
	Clove Oil, q. s. ad. paste.	
℞	Arsenic trioxid	ʒ I
	Cocain	gr. XX
	Thymol	gr. V
	Lanolin, q. s. ft. thin paste. (Buckley).	

472. What is *Devitalizing Fiber?*

Devitalizing paste is mixed with cotton fiber and cut into shreds ready for use.

473. What *Other Preparations* have been recommended for devitalizing pulps?

Arsenic pentoxid or sodium arsenate, made into a paste with glycerine, recommended by Dr. Geo. T. Fette, of Cincinnati. These preparations are very slow in their action, painless, and may be allowed to remain sealed into the cavity indefinitely without harm. They are obviously advantageous in certain cases.

474. What *Factors Influence* the action of arsenic?

First, age and physical condition of the patient; it acting more rapidly in youth and old age, as well as in patients of low vitality, if the pulps are healthy.

Second, condition of the pulp. Its action is less rapid in constructive diseases of the pulp.

Third, the amount and condition of the intervening dentin. It is less rapid in action through thick layers of dentin and through secondary dentin.

Fourth, climate and season. Warm temperatures hasten its action.

475. *How Long* should arsenic be sealed into the tooth?

In adult teeth it may be left from two to six days, depending on the above conditions. In young teeth it should, as a rule, be removed at the end of twelve or twenty-four hours. It is claimed by some that it does not penetrate through fully-formed apical foramina, and consequently will do no harm to the tissues of the apical space under those conditions, unless it be allowed to remain too long. This is disputed, however, by many good authorities and the tendency in modern practice is to abandon its use, on account of its poisonous and necrotic effects on the soft tissues. In teeth with unformed roots, it is a very dangerous remedy and, if used at all, it should be watched very closely. Under these circumstances, the time of its action should be limited to a few hours. In addition to the destruction of tissues likely to arise from its passage to the apical space, is the ever-present menace of its accidental contact with the soft tissues of the mouth, with consequent arsenical necrosis of these parts. The rubber dam always should be in position during its application.

476. Give the symptoms and treatment of local *Arsenical Poisoning.*

Symptoms. In the milder cases, the gum may be swollen, red, tender and inflamed, later presenting a grayish, sloughing area, which may be scraped away painlessly. In the more marked cases the inflammatory and suppurative condition may extend to the submucous tissues, the pericementum, periosteum and bone, resulting in the loosening and loss of one or more teeth. Cases of death, from extension and extensive necrosis, have been reported in susceptible individuals.

Treatment. As a preventive, forcibly flush with an antiseptic wash, and paint the gum with dialyzed iron, or tincture of iodin, after removal of the dam. After the condition has arisen, curette the affected tissues, bleed freely, flush forcibly with an antiseptic solution, sterilize, and stimulate the parts with hydrogen dioxid, tincture of iodin or euroform paste, repeating the treatment every other day. Have the patient use an antiseptic wash in the interim. Sometimes though rarely, one or more teeth will have to be extracted, dead bone drilled away, and bone sequestra removed.

477. Describe the operation of *Pressure Anesthesia.*

Cocain or novocain has the property of temporarily depriving the tissues of sensation. When forced into the tissues of the pulp, that organ is for a time anesthetized, when it may be painlessly removed. The method is greatly to be preferred to that of devitalization, on account of its rapidity and the lessened tendency to dangerous sequelæ, as in the use of arsenic trioxid.

A Under aseptic precautions establish the outline form, remove the decay, and make the cavity slightly retentive, avoiding pressure on the pulp.

B If the pulp is aching, place gently over the exposure a pledget of cotton saturated with an anodyne, such as eugenol or oil of cloves, and seal (avoiding pressure), with base-plate gutta-percha or cement, allowing it to remain for from twenty-four to forty-eight hours.

C Place a small pellet of novocain hydrochlorid in the bottom of the cavity, and, after adding a drop of sterile water, when it will be dissolved, cover it with a pledget of cotton.

D Cut a piece of soft unvulcanized rubber, of a size sufficient to fill the cavity, and with a large amalgam plugger or smooth burnisher, slowly and gradually apply pressure, thus forcing the solution into the pulp, constantly maintaining pressure until it does not elicit pain, when the rubber and cotton are removed and the pulp is ready for extirpation, (removal). The rubber is placed so that it acts as a washer and prevents the backward flow of the solution. The technic of removal of pulps and opening pulp chambers and canals is fully described in Chapter XXI.

478. Why should *Adrenalin Chlorid* and similar preparations in combination with novocain be avoided for pressure anesthesia?

On account of the danger of being forced into the apical space, temporarily constringing these tissues, and resulting later in secondary hemorrhage and a sore tooth (traumatic pericementitis).

479. What agents are recommended for *Hemorrhage* following pulp removal?

In mild cases, swab the canal with alcohol, sterile water, or peppermint water. Do not use peroxid of hydrogen, on account of its tendency to unite with the iron of the hemoglobin of the blood, form ferric hydroxid, enter the tubules and produce staining. In the graver cases, use phenol, phenol compound, phenol-sulphonic acid, fifteen per cent. trichloracetic acid, formocresol, Black's 1-2-3 or adrenalin chlorid.

480. Why should the use of *Tannic Acid* or glycerite of tannin be avoided in root-canal work.

On account of its tendency to unite with the iron of the blood, form a black iron tannate, and produce staining.

481. How may the *Color* of the tooth be *Preserved* during pulp treatment?

The color of the tooth depends largely upon the array of colors in the dentin, which are reflected through the enamel, and not on its vitality or non-vitality. This being the case, the saliva should be excluded at once and never again be allowed to enter, since it will carry infection and discoloring agents. In addition, all colored drugs and drugs capable of producing staining should be avoided. For the same reason, all remains of blood and pulp remnants should be perfectly removed.

482. What *Agents* should usually be *Sealed in the Canal* after pulp removal?

Anodyne, antiseptic preparations, such as phenol compound, (Buckley), thymophen (Kirk), thymocamphen (Prinz), eugenol, clove oil, campho-phenique, or Black's 1-2-3.

483. What *Complications* are occasionally met with in treating pulps?

Hypertrophied gum, hypertrophied pulp (chronic hypertrophic pulpitis), recession of the pulp, secondary dentin, and calcific formations in the pulp.

484. *Diagnose* between *Hypertrophied Gum* and *Hypertrophied Pulp*.

The pulp tissue is usually more sensitive and bleeds more readily. Hypertrophied gum tissue is usually tougher and more fibrous. A history of the case frequently will assist in the diagnosis, hypertrophic pulp often giving a history of previous pain and other symptoms of pulp disturbance. The use of a flat-bladed spatula will sometimes enable the operator to expose the attachment of the mass to the gum at the gingival margin, in case it is gum tissue. Sometimes the ablation of the bulk of the mass is necessary before a correct diagnosis can be made, especially in cases of perforation of the pulp chamber, and growth of the mass through the opening, into a large cavity, in a badly broken-down tooth.

485. Give the *Treatment* for these conditions.

In the simpler cases of hypertrophic gum, the cavity may be enlarged, flushed with a warm antiseptic solution, dried and packed for a few days with gutta-percha, forcing the gum tissue away, so that the cavity preparation and filling may be completed. *In the more extensive cases*, the growth should be removed with a sterile lancet, gum scissors, or the electric cautery, and hemorrhage controlled with caustics, such as phenol, phenol-sulphonic acid, fifty per cent., or trichloracetic acid, fifteen per cent. *In cases of hypertrophied pulp tissue*, the pedunculated mass may first be removed in the same manner as mentioned for the removal of gum tissues, using a local or general anesthetic, after which pressure anesthesia or devitalization may be resorted to. In case the tissue resists both of the latter, resort may be had to the electric or chemical cautery, or nitrous oxid anesthesia.

486. Describe the treatment for *Recession of the Pulp*, *Secondary Dentin* formations, and *Calcific Deposits* in the pulp.

These conditions are usually very resistant to arsenic and pressure anesthesia. A combination of both methods, and repeated applications, often will be necessary. A pulp nodule will sometimes have to be drilled around with a small round bur, tapped and dislodged, either with a bur or an excavator. Nitrous oxid and oxygen analgesia, or conductive anesthesia will sometimes have to be resorted to. The use of sodium-potassium alloy, sodium-dioxid, or sulphuric acid forty per cent. solution will greatly assist in the removal of pulp nodules and secondary dentin formations, through their solvent effect on masses of this nature.

487. Give three reasons for *Avoidance of Immediate Root Fillings* after pressure anesthesia.

First, the apical tissues frequently are anesthetized, with the result that there is no way of knowing whether the apical end of the root is properly filled.

Second, tearing away of the pulp from its apical connections produces irritation, which should first be allowed to subside.

Third, the danger of secondary hemorrhage with consequent formation of a blood clot.

(To be continued.)

Preparedness League of American Dentists

The following letter from the Secretary of War came as an unexpected recognition of the services rendered by the League during the war. Attached also is the reply:

WAR DEPARTMENT
WASHINGTON

DR. J. WRIGHT BEACH,
Allen Street, Buffalo, N. Y.

March 4, 1921.

My dear Dr Beach:

I desire to express to you the appreciation of the War Department of the services rendered the armed forces of our nation by the Preparedness League of American Dentists under your able direction as its Founder and President.

The loyalty, the meritorious character, and the magnitude of performance of the services rendered by the Preparedness League calls forth the highest praise upon the dental profession in general and upon you in particular.

In this I desire also to add my personal appreciation of the patriotic services rendered by you as Founder and President of the Preparedness League of American Dentists

Cordially yours,
JOHN W. WEEKS, *Secretary of War.*

HON. JOHN W. WEEKS, *Secretary of War,*
Washington, D. C.

Buffalo, N. Y., March 12, 1921.

Honorable Sir:

The officers of the Preparedness League of American Dentists are deeply sensible of the distinction you, as representative of the government, have conferred upon the organization, as per your letter of March 4th, the contents of which will be forwarded to as many as possible of our 19,000 members, and we beg to assure you that the service rendered to our government and to our soldiers was accomplished through the influence of the unselfish spirit which prompted the American people to the highest service during out greatest crisis.

It also is gratifying to us to know that this recognition came as one of the first official acts in assuming the duties of your most important office.

We beg to remain, Honorable Sir,

Very truly yours,
PREPAREDNESS LEAGUE OF AMERICAN DENTISTS.,
J. W. BEACH, *President.*

EDITORIAL

REPLANTATION, TRANSPLANTATION AND IMPLANTATION OF TEETH

An inquirer asks:

"How long ago was plantation of teeth practiced and with what success?"

In an old work on dentistry published more than a hundred years ago the author refers to the transplantation of teeth as follows:

"An operation, long since devised by the late Mr. Hunter, is now entirely laid aside, namely, that of transplanting human teeth. It consists in extracting the diseased tooth and substituting another in its place. The operation is extremely limited, being confined only to the front teeth, or those having single fangs.

"With a view to success, the tooth to be substituted must be instantly transferred from the mouth of the individual who submits to the sacrifice, to its intended situation, and there properly fixed until it acquires a firm position in the socket.

"The failure of this operation in the greater number of cases, has occasioned it to be laid aside, as the adhesion of the tooth in its proper situation, depends on a variety of minute circumstances; for example, the substituted tooth must be rather smaller than the one extracted; the extraction also must be carefully made so as not to produce any material injury to the socket; and lastly, both parties must be of a healthy constitution, that the process of healing or adhesion may readily take place. Hence, after undergoing this painful operation and submitting to the penance of a fluid regimen for some weeks it has too often proved unsuccessful, and cases are notorious in which, after it has been considered successful, very grievous diseases have been introduced into the system.

"Experience has now fully proved that the duration of these teeth is limited to a very few years.

"In favor of the operation, however, Mr. Hunter has adduced a variety of arguments to show that disease cannot be inoculated into the system by such means; but facts are not wanting to prove the reverse, and any explanation in the principle of common irritation, to account for its numerous varied and even fatal consequences, cannot do away the just and well-grounded prejudice that attaches to this practice.

"It was, notwithstanding, an ingenious speculation on the part of Mr. Hunter, and showed what the powers of the system are capable of doing in the reparation of disorganized parts."

Although Hunter is credited with having first advocated the operation of transplantation of teeth, we find that Fauchard had practiced it fifty years previously, and that replantation of teeth was advocated and practiced by Abulcasis as early as 1100 A. D. His method was to replace the tooth in its socket and bind it to adjacent teeth by means of fine gold wire.

Transplantation of teeth was introduced in America by a French dentist, Lemaire, who came here with the French army in 1781, and in the earliest days of American dentistry the practice was considerably in vogue.

Replantation, returning an extracted or lost tooth to its own socket, was particularly advocated by Hunter and probably met with more success than transplantation.

About 1884, Dr. Younger, then of San Francisco, introduced the operation of implantation of teeth, making a new socket and implanting a freshly-extracted tooth in a place where a tooth had been lost for some time. A suitable natural tooth having been selected, the tooth and the region in the mouth to be operated upon were sterilized, incisions made in the gum, but usually no gum tissue was removed, the flaps being needed for the new festoons, a socket was drilled into the bone of the jaw as nearly the size, shape and depth required for the root of the tooth as practicable, the new tooth inserted, after having its pulp removed and the root canal filled, and rigidly fastened to adjoining teeth until it had become solid in the jaw, the most careful aseptic precautions being observed throughout the operation.

In the earlier days the necessity for aseptic or antiseptic precautions was not understood and probably teeth replanted and transplanted did not have the pulps removed and the canals filled. But with all the aseptic precautions used in the later years it was found that nearly all of the replanted, transplanted and implanted teeth were lost within three to nine years by absorption of their roots, and the practice was practically abandoned.

As we go to press we learn of the death of Dr. O. E. Lamphear, Kalamazoo, Mich., a good friend of and a contributor to THE DENTAL SUMMARY. Fitting obituary next month.

Kansas State Board

The Kansas Board of Dental Examiners will meet a Wichita, Kansas, June 20th, beginning at 7:30 P. M. for the examination of applicants for license and the transaction of any other business that may come before the board. For application blanks and any other information, write,

G. F. AMBROSE, *Secretary*,
111½ South Main St., Eldorado, Kansas.

SOCIETY·ANNOUNCEMENTS

North Carolina Dental Society

The date of the annual meeting of the North Carolina Dental Society has been changed from June 21-23 to June 28-30, 1921.

Yours very truly,

H. O. LINEBERGER, *Secretary.*

Northern Ohio Dental Association

Meeting to be held in Cleveland, June 6, 7, 8.

Full Denture Construction (A Post-Graduate Course)—Dr. Dayton Dunbar Campbell.

Alveolar Process Resection—Dr. Carl D. Lucas.

Partial Restorations—Dr. Norman B. Nesbett.

Root Canal Problem of Today—Dr. Edouard M. Hall.

Oral Diagnosis—Dr. Chalmers J. Lyons.

Demonstrative Clinic Courses will be offered free, and will include the practical subjects of the day.

Ohio Headquarters at Milwaukee

The Ohio Dental Club sent a representative to Milwaukee in September to look over the hotels and we have selected the Hotel Wisconsin as our Ohio Headquarters. We have reserved sixty rooms for one hundred people. These are being taken very fast.

If you intend to attend the meeting and wish to be with the Ohio dentists, make your wants known to the club officers at once.

The club will have a special train leaving Cincinnati, Saturday noon, August 13, arriving in Milwaukee Sunday morning.

E. L. PETTIBONE,
6503 Detroit Avenue, Cleveland, Ohio.

Wisconsin State Board

The Wisconsin State Board of Dental Examiners will conduct a licensing examination at the Marquette Dental College, in Milwaukee, beginning Saturday, June 18, and continuing to Saturday, June 25, 1921.

The Wisconsin dental law provides that, "No person shall be examined by the board for a license to practice dentistry in this state, who shall not file with the secretary of the board, credentials proving to the satisfaction of the board, that he has a general education equivalent to that required for graduation from a high school or academy in the state of Wisconsin, having a four-year course beyond that of the eighth grade of the elementary school, and who is not a regular graduate of a reputable dental college or dental department of a university."

All credentials should be in the hands of the secretary of the board not later than June 5, 1921.

William Kettler, *Secretary,*
480 Berlin Arcade, Milwaukee, Wis.

Illinois State Board

The 57th Annual Meeting of the Illinois State Dental Society will be held in Peoria, Illinois, May 10, 11 and 12, 1921.

The officers of the society are as follows:

President, J. P. Luthringer, 608 Jefferson Bldg., Peoria, Ill.; vice-president, C. W. Coltrin, 208 N. Mason Ave., Chicago, Ill.; president-elect, F. B. Noyes, Peoples Gas Bldg., Chicago, Ill.; secretary, Arthur G. Smith, 511 Central Nat'l. Bank Bldg., Peoria, Ill.; treasurer, T. L. Grisamore, 29 E. Madison St., Chicago, Ill.; librarian, G. H. Henderson, 340 N. Central Ave., Chicago, Ill.

Fraternally yours,
Arthur G. Smith, *Secretary.*

Arkansas State

At Little Rock, May 16-21, 1921; post-graduate, under the instruction of Dr. A. E. Smith, Chicago—Oral Surgery and Conductive Anesthesia; Dr. Elbert E. Owen, St. Louis, Mo.—Full Denture Prosthesis; Dr. N. B. Nesbett, Boston—Partial Dentures and Removable Bridgework; G. E. Harter, Toledo, Ohio,—The Dentist and His Dollar. All meetings will be held at State Capital building, Little Rock. This is going to be a big meeting. Make your reservations now.

E. L. Miley, *President.*
W. E. Williams, *Secretary-Treas.*

Iowa State Board

The Iowa State Board of Dental Examiners will meet for the purpose of examining candidates for a license to practice in Iowa, at Iowa City, College of Dentistry, beginning Monday, June 6th, 1921, at 9:00 A. M.

For further information and application blanks, address,

Dr. C. B. Miller, *Secretary,*
726 Fleming Bldg., Des Moines, Iowa.

Indiana State

The 1921 meeting promises to be the best ever held. Complete program which appeared in March and April issues, includes such men as H. E. Friesell, Alfred C. Fones, (Bridgeport, Conn.), M. M. House, R. H. Volland, Wm. F. King, L. M. Wirt and Carl D. Lucas. Seventy-five clinics. Of course, you'll be there—but better look after hotel accommodations *now*.

Noblesville, Ind. EARL BROOKS, *Ex. Com.*

The Board of Dental Examiners of Alabama

The Board of Dental Examiners of Alabama will meet Monday, June 20, 1921, at nine o'clock A.M., at the Birmingham Dental College, Avenue F and 20th street, Birmingham, Alabama, for the purpose of examining applicants who hold diplomas from reputable dental colleges, for certificate of qualification to practice dentistry in Alabama.

All applications accompanied by the examination fee must be filed with the secretary-treasurer at least one week before the examination. For further information, application blanks, etc., address

H. CLAY HASSELL, *Secretary-Treasurer,*
616 22nd Avenue, Tuscaloosa, Alabama.

Pennsylvania State Board

The next regular examination of the Pennsylvania Board of Dental Examiners will be held in Philadelphia and Pittsburgh, Wednesday, Thursday, Friday and Saturday, June 22, 23, 24 and 25. The theoretical examinations will be held in Musical Fund Hall, 808 Locust Street, Philadelphia and the College of Pharmacy Building, Bride and Bluff Streets, Pittsburgh, on Wednesday, Thursday and Friday, June 22, 23, 24. The practical examinations will be held on Saturday, June 25, in the Evans Dental Institute, Philadelphia and the University of Pittsburgh, Pittsburgh.

Students who present evidence of having passed their second year examinations in June, may appear for the divided examinations on Wednesday and Thursday, June 22 and 23, in anatomy, physiology, dental anatomy, histology, metallurgy, chemistry and bacteriology.

A law having been enacted at the recent session of the legislature licensing dental hygienists, an examination will be held on Wednesday, Thursday and Saturday, June 22, 23 and 25, at the above places.

Application papers may be secured from the Department of Public Instruction, Harrisburg. For further information address

ALEXANDER H. REYNOLDS, *Secretary,*
4630 Chester Avenue, Philadelphia.

The American Academy of Periodontology

The eighth annual meeting of the American Academy of Periodontology will be held at the Hotel Commodore, New York City, May 9 and 10, 1921.

J. HERBERT HOOD, *Secy.-Treas.*,
1101 Guardian Bldg., Cleveland, Ohio.

National Dental Association Meeting

Milwaukee, August 15 to 19, 1921, inclusive.

Milwaukee, metropolis of Wisconsin, famed from coast to coast for its homes, health, and hospitality, as well as for the fact that it is the greatest convention city in the middle west, will act as a great reception committee and hostess to the 8000 or more delegates, visitors, and guests, attending the twenty-fifth or Silver Anniversary Convention of the National Dental Association, on August 15 to 19, 1921.

Those who come to Milwaukee during the National Dental Convention are assured of a most interesting and entertaining visit, evidence of which is furnished in the fact that during 1920 the Badger Metropolis of nearly a half million persons played host and hostess to more than 200 convention bodies, ranging from county and state to national organizations.

Milwaukee's Auditorium, an ornate structure right in the heart of the city, erected at a cost of $1,500,000, will be the scene of the great gathering of representatives of the dental profession and its allied activities. The Auditorium, conceded without argument, to be the finest and most commodious, as well as the most conveniently arranged convention or exposition building in the world, covers an entire block within walking distance of the business district and hotels. The massive structure embraces within its expansiveness, six separate minor auditoriums under one roof, the smallest of which seats 300 persons, and the largest having accommodation for 10,000. Mechanics Hall, in the building in which the dental exhibit will be held, adds 46,000 square feet of floor space for exhibition purposes, making a total floor space for exhibits of 103,000 square feet.

Milwaukee's hotels, which have a national reputation for excellence and genuine hospitality, not forced by commercialism, but spontaneous because of the very nature of things, are making elaborate preparations to provide for the comfort, convenience, and pleasure of the thousands of guests who will register within their walls. With more than twenty hostelries of high standing, few cities are better equipped or capable of handling so many transients at one time. The respective houses are well ordered for entertaining the heavy business, tourist and convention traffic.

Management of the various hotels have already reported reservations for the convention in August, which is indicative of the fact that the entire country from coast to coast, and north to south, will have representation at the great Silver Anniversary gathering of one of the leading professions. The list of Milwaukee's leading hotels, the proprietors of which have given the convention committee full assurance of complete cooperation in providing for the thousands of visitors on August 15 to 19, are: Milwaukee Athletic Club, Mason and Broadway; Hotel Aberdeen, 909 Grand avenue; Hotel Blatz, East Water street, corner of Oneida street; Hotel Carlton, Milwaukee street; Hotel Charlotte, 138 Third street; Hotel Gilpatrick, 223 Third street; Globe Hotel, corner Wisconsin and Cass streets; Hotel Juneau, 225 Wisconsin street; Hotel Marquette, 188 Wisconsin street; Hotel Maryland, 137 Fourth street; Hotel Martin, Wisconsin street; Hotel Medford, corner Third and Sycamore streets; Hotel Miller, Third street, near Grand avenue; Hotel Pfister, Wisconsin and Jefferson streets; Hotel Plankinton, West Water and Sycamore streets; Republican House, Third and Cedar streets; Hotel Randolph, 134 Third street; Schlitz Hotel, Grand avenue and third street; Hotel St. Charles, City Hall Square; Hotel Wisconsin, Third street, near Grand avenue.

Northern Ohio

At Cleveland, three big convention days, June 6, 7, 8; followed by three days post-graduate work on denture prosthetics, June 9, 10, 11.

Partial program, June 6, 7, 8:

Full Denture Construction—Dayton Dunbar Campbell.

Remember—That Dr. Campbell gives lectures and demonstrations before the entire convention each of the first three days. No extra fee for that. If you never heard him, you have a treat ahead of you.

Alveolar Process Resection—Carl D. Lucas.

Remember—That Carl Lucas has made a name for himself as an instructor as well as an oral surgeon.

Partial Restorations—Norman B. Nesbett.

Remember—Dr. Nesbett is the originator of the cast gold clasp. With twenty years' experience behind him, he will have some wonderful things to tell us.

The Root-Canal Problem of Today—Eduard M. Hall.

Remember—That Dr. Hall does clean-cut effective work wherever he goes. He knows what he has to say and says it.

Oral Diagnosis—Chalmers J. Lyons.

Remember—No need to tell Ohio people to remember Chalmers J. Lyons. They couldn't forget him or his work if they wanted to—which they by no means do.

Post-Graduate Course—June 9, 10, 11, under direction of Dr. Dayton Dunbar Campbell, Kansas City, Mo.

There is to be but one post-graduate course this year, but it will be the most thorough-going ever given before the Northern Ohio Association. With Dr. Dayton D. Campbell in charge, each member of the class will be expected to don laboratory apron, roll his up sleeves and actually do the work of casting a metal base, constructing occlusion model, taking the bite, mounting the case upon the articulator, and setting up a full upper and lower set of teeth. All materials and necessary equipment will be furnished by the demonstrator. Bring nothing with you except an open mind and your two good hands. An extra fee charged for this course.

This course was given by Dr. Campbell before five State Societies in 1920, and he is to repeat them before four of the five this year. If you haven't received a letter and application card, write Dr. J. V. Gentilly, Chairman, Ex. Com., 809 Schofield Bldg., Cleveland, Ohio, and ask for them at once.

Here is a half-day's work that will repay amply every dollar of expense and every moment of time—all free to members. Demonstrative Clinics on:

Tinker Construction of Crowns and Bridges,
Porcelan Technic,
Radiographic Technic and Demonstration,
Attachments for Partial Dentures and Saddle Construction,
Gold Inlay Technic,
Removable Bridgework,
Root-Canal Technic.

The clinicians have been carefully selected, and are men who have devoted much time and study to their chosen subjects. What's more, they are men who are able to impart their knowledge in a simple, comprehensible manner. A busy half-day; one very well worth your while.

Just a hint—Cleveland parks are likely to be chilly even in June. So make you hotel reservations *now*.

Idaho State

The second annual Post-Graduate Course of the Idaho State Dental Association will be held in Boise, June 27, 28, 29, 30, July 1, 2, inclusive.

Class instructors—Dr. D. D. Campbell—Full Denture Construction. Dr. Arthur E. Smith—Oral Surgery, Exodontia, Anesthesia.

Very truly,
L. G. PHILLIPS, *President*, Jerome, Idaho.
M. J. GOODE, *Secretary*, Filer, Idaho.

Indiana State Board

The Indiana State Board of Dental Examiners will hold its next examination in Indianapolis, June 20 to 25. For application and instructions write to H. C. McKittrick, D.D.S., 1006 Odd Fellow Bldg., Indianapolis, Indiana.

H. C. MCKITTRICK, *Secy.-Treas.*

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NEWS and OPINIONS

CONDUCTED BY G. E. HARTER

I had the pleasure of meeting a live bunch of fellows in attendance at the fifteenth annual meeting of the West Virginia State, 'way down at Bluefield, April 11, 12, 13, and was again impressed with the very evident fact that men down that way know how to conduct such meetings. In spite of very inadequate accommodations at the hotel where meetings were held, necessitating dodging about from one room to another and occasioning some delay in opening the meetings, everything passed off practically as planned, much to the credit of those having the work in charge, particularly Drs. I. J. Kail, of Huntington, Chairman program committee, and J. D. McCue, Chairman committee of arrangements, and all their able assistants.

Following the president's address on the morning of the first day, Dr. W. A. Lurie occupied the rest of the forenoon very acceptably to an attentive audience on, "Essentials for Dental Roentgenographic Interpretation." Dr. Lurie pleads for, and suggests a new terminology which seems desirable, particularly with regard to the picture itself, which is in no sense a shadow, but the result of penetration of light. Dr. Lurie's "Penetogram" met with general approval.

In the afternoon the time was occupied by G. E. Harter, of THE DENTAL SUMMARY, on the topic, "Financing Both Ends of a Dental Practice," and by Dr. Lurie again, bringing his public work to a close. His afternoon topic had to do with "Diagnosis."

At the Colonial theater, 9:00 A.M., Tuesday, before a crowded audience, a number of popular talks on oral hygiene work were given, principally by Drs. Sidney J. Rauh, Cincinnati; G. T. Epling, director Jenkinjones Dental Dispensary; Miss Florence Feeney, formerly of the Forsythe Infirmary, Boston; followed by the most interesting display of the results of the oral hygiene movement I ever have witnessed, including a moving picture film prepared and presented by the McDowell-County Clinic Club.

At 1:30 P.M., the Callahan Study Club, of Cincinnati, presented its progressive clinic on Partial Dentures. This was followed by a business session, election of officers, and, at 7:00 P.M., by the banquet, at which interesting speakers presented various topics, the most important being a paper by Dr. G. C. Howard, on the status of dental legislation in West Virginia, upon which Dr. Howard could and did present first-hand testimony, being a member of the legislature, a position accepted by him for the sole purpose of serving his profession. Dr. Howard emphasized the statement that there should be at least one dental member of every state law-making body. The clinics on Wednesday were presented by various components of the state organization, showed unusual preparation and interest.

The election resulted: President, W. S. Rosenheim, Williamson; first vice-president, D. G. Howard, West Union; second vice-president, F. E. Hess, Fairmount; secretary, N. P. McDermid, Charleston; treasurer, D. C. Clark, Morgantown, the latter two being re-elected. The meeting next year is to be held at Fairmount.

Papers and addresses will appear in future issues of THE DENTAL SUMMARY, official magazine of the society.

The ride between Columbus, Ohio, and Bluefield presented one constant panorama of beautiful scenery, especially after entering West Virginia. The road follows the valley of the Tug river, hemmed in by lofty hills and mountains, twisting in and out, dodging through tunnels, up-hill and down, under overhanging craigs, along dizzy precipices, and reaches the crest at Bluefield, nearly 2600 feet above sea-level, from which it dips down and down until it reaches the Atlantic at Norfolk, Va. At Bluefield is located what is possibly the greatest gravity railroad yard in the world. Cars are merely pushed to the top of the grade, when gravity seizes them and completes the work. The entire experience was well worth the time and effort necessary, and I am pleased to have an invitation to repeat the visit next year.

The contemplated dental law up in Washington has fizzled again; the committees having it in charge failed to agree; failure due to inability of ethical and advertiser to "get together." Nothing but failure was to have been expected. Widely differing ideals separate the two, and when that is the case, any agreement must surely be only a temporary expedient, a "*pons asinorum,*" as it were. One great trouble with the world right now is its acceptance of programs of expediency rather than of those based upon principle. Any way to get *this* particular knot untangled, no matter how many other knots are tangled up in the doing of it. Yet, if there is any truth in the world it is to be found in that old saying: "Nothing ever is settled until it is settled right," and *Right* means *Justice, Equity, Fairness;* "a fair field and no favor;" and it does not mean and never did mean merely getting around the next corner in the easiest way. Every time a man or a nation chooses that "easiest way," very soon that man or that nation is brought up with a short turn. The old law of compensation still is "on the job." We cannot have without paying, no matter what we may think or desire.

On my recent visit to West Virginia, my eyes were opened to an almost unbelievable state of affairs. Of course, everybody has heard of the great "miners' strike," of the murders at Matewan, and of what practically amounts to a state of civil war down there. Armed guards at every station, sometimes with rifle at the ready, looked mighty sinister. Goods unloaded from express cars were immediately covered by guards. Crowds of idle men seemingly with no other employment than watching the train come and go. I always am sorry for strikers, always wrong, always ill-advised, always sure to pay the fiddler for their idle days no matter how seemingly just their cause may be. A strike cannot be right. No man and no body of men possibly can have the right to interfere with the rights of others—and every strike is precisely such an interference. Every man has the right to work or not to work as he sees fit, and no man has the right to interfere with that right. There is much more that might be said, but that is quite enough. Its implications are far-reaching and compelling. I have been particularly sorry for the West Virginia miners—foreign, ignorant, uncouth, some of them seem only about half-human; unable to understand the principles underlying our present pinching time of readjustment, I felt that they were bringing worse conditions upon themselves by their defiance of natural law and legal enactments. Imagine my surprise to learn that very few miners were in any manner concerned. It is not the miners who are living down there in whole towns of tents—not the real, simon-pure miners. Most of them are merely dummy make-believes, toughs and roughs and sour-balls, hired by the agitators to go down there and live in tents and carry on the show of lock-out, eviction, etc., at three dollars per day per man, paid out of labor-organization funds, for the purpose of holding up the present high wage scale, in spite of the operation of that same old law of compensation. Mines cannot operate at present wages and meet the demand for lower prices for coal. Everybody knows that. The more intelligent of the miners admit it. Asked why, then, they do not accept a reasonable reduction, their only reply is that they dare not for fear of the Unions. Left to their own decision, ninety-nine per cent. of the men who are out would accept the price offered and go to work. But that would not meet the ideas and purposes of the agitator, the demagogue, the walking delegate; he would be out of a job; and that proposition he fights with his mouth, with his fists, with clubs and stones—yes, and with shot-gun, rifle, "gat" and dynamite. And that's the why of the guards; that's the why of the tent-towns and the thousands of idle men. And that's why I'm sorry for all of them. Only defeat and greater suffering lies in the future for those who interfere with the rights of other men. It is so written in the law that man did not make.

The Muncie, Ind., high-school clinic is doing good work and seems to be backed by the parents. Cooperation is essential. Get that into the minds of your people.

Reports are coming of dentists addressing Rotary, Kiwanis and Exchange Clubs, seemingly with satisfaction to all concerned. Seems to me that a great deal of good can be done by such talks. I heard Dr. Sidney Rauh, of Cincinnati, address the Rotary Club, of Bluefield, W. Va. a few days ago, during the convention down there. He knows how, and will be glad to help anybody to prepare for the job. After a few "snappy" remarks, he helped himself to a tooth brush out of a convenient pocket and proceeded to show those hundred or so men how to make a tooth so clean that it never can decay. Good business.

Ever hear of "Novocain Dermatitis?" That's a new one to me. Said to be some sort of a skin disease. If you know anything about it, let's have a paper on it. Is novocain likely to be the source of disease?

Dr. A. G. Buckner, director of the Tennessee State Bureau of Oral Hygiene is cooperating with United States Public Health Service in various cities and towns throughout the state. If every dentist had the energy of Dr. Buckner, and kept it so busily employed, almost anything might be predicted for dentistry of the future.

Dentist of Wabash and North Manchester, Ind., have united to form a new society for cooperation and betterment. Officers chosen for the year were Dr. C. H. Risser, of Manchester, president and W. G. Cranning, secretary, also of Manchester. Committees chosen were: Arrangements, C. J. Snideman, Fred Grafft and J. M. Canfield; entertainment, Glen Wright, Arch Porter and M. A. Payne; reception, C. H. Risser, W. H. Schaffer and L. G. A. Powell.

Legislation sought by West Virginia dentists would provide for the establishment of training schools, amend the state board of examiners, and the licensing of dental hygienists.

New Jersey dentists are at war with each other again. Must be something in the air down there that makes every fellow want to fight the other fellow. This time it's over a new dental law that does something that part of 'em don't want and the rest do—and there y'ar.

New York is to have another building exclusively for medical and dental offices; Minneapolis, Minn., and Toledo, Ohio, are taking the preliminary steps toward the erection of such buildings. Mighty good work, particularly as the plans contemplate very reasonable rentals.

My space in the May SUMMARY is only about one-tenth as great as it should be to carry all that is pressing. Dental news grows more and more plentiful as the months go by. How many of the readers of this department want to see it enlarged? How many would rather it were discontinued entirely? Don't all speak at once, but I'd like your opinions.

The anti-organization dentists of the State of Washington certainly are a belligerent lot. Not satisfied with defeating the proposed new law, they are now attacking the state board and about everything else in sight, through the courts. They seem to have no lack of either money or brains, nor do they hesitate to use both. Begins to look like a finish-fight up there. When the smoke blows away the "ethical" men may find themselves outlaws, and the other fellows on the throne.

The Naval Medical Corps and the Naval Dental Corps have only about one-third of a full force, owing to the demand for dentists in private practice, with much higher income. Every department and branch of the government service is finding itself in precisely the same predicament, with no way known of bringing about better conditions. There is no way of forcing anybody to accept governmental appointment, and appeals to patriotism that went well enough during wartime, may be expected to fall upon deaf ears now, when government pay offers only a fraction of the ordinary private income.

The State of Washington has refused to appropriate a single dollar for either dental or medical clinic during the next two years. Wonder what it did for hogs and cattle?

The Dental Outlook

DR. HARTZELL SAYS THAT FIVE TIMES THE PRESENT NUMBER OF DENTISTS ARE NEEDED.

Dallas, Texas, March 13.—Before the Texas State Dental Society here today, Dr. T. B. Hartzell, of Minneapolis, president-elect of the National Dental Association, said that last year there were 44,000 dentists in the United States, or one for every 2,500 people.Further:

At this rate, if every dentist worked eight hours per day every working day in the year; he could devote only one hour per year to each patient, an amount of time wholly inadequate.

Now that the National Government has recognized dentistry, giving to the dental officer in the United States army exactly the same rank, pay and opportunity to rise as to all other army corps, the position of the dentist in social fabric is fixed, and his value to the country in the protection of the public health can no longer be doubted. Therefore, it is important that the country be furnished more and better dentists.

We should have at least five times as many dentists in active practice as there now are if everyone is to receive proper dental care. That this is impossible is shown by a glance at the dental educational situation in America today.

In 1908, we had 36,000 dentists in this country. In 1920 we had 44,000—showing a gain of approximately 7,200 in twelve years. In the same period of time 29,542 dentists were graduated from all of our dental schools. This makes an average graduating class of 2,272 and an average annual wastage has occurred, by men dying or leaving the profession, of 1,720 per year. In 1908, we had fifty-seven dental schools with 6,919 students in attendance, and a graduating class for that year of 1,754. In 1920 we have only forty-six dental schools with 9,302 students enrolled, and a graduating class of only 1,042 and only 898 graduates, this being an off year on account of a change from the three-year course to a course of four years now required for the education of a dentist.

At present we have only forty-five colleges with a student enrollment of 12,195, and a senior class of 1,938. If our annual wastage was 1,754 per year for the last ten years the increase in total number of dentists will bring it up approximately to 1,900 per year on our present basis, so that in the year 1920 we did not graduate enough dentists to overcome that year's wastage by 858. If we graduate every member of the present senior class in 1921, we will just offset the year's wastage and exactly the same thing will be true for 1922 as our schools have a junior class of only 1,943.

Therefore, the prospects for obtaining more and better dentists seem to be very discourag-

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ing. At the same time the United States Government is teaching the soldiers the value of dentistry by spending at the present time more than $1,000,000 per month for the repair of the soldier's mouths.

Dental associations all over the country are teaching the people the value of dentistry in the preservation of health. We are creating a demand for more and better dentists on the one hand, and failing to supply that demand on the other.

Every state should support dental education, making more and better dentists and reducing the cost of dentistry to the workman, the clerk and the farmer.

The state should also endow colleges for the teaching of both dentistry and medicine and the situation might be made better if in addition to this, states were to authorize the license of dental assistants. This license could be issued to intelligent women of whom the demand for four years of high school work and four years of college work need not be made, but who could in half to a fourth that time, learn to do the more simple operations of cleansing teeth and assist the legalized practitioners so that they might accomplish vastly more work than they are now able to do.

That this is important should be driven home to the American public, if we are to maintain that freedom of action guaranteed by our Constitution to every citizen of the United States, because if we do not maintain a proper supply of dental and medical professional men in this country, we must, of necessity, eventually be compelled to socialize both medicine and dentistry, as has been done in England and most of the foreign countries of the world to a greater or lesser degree. The socialization of medicine commenced in Germany, in 1881, when Bismarck advised the Reichstag to make into law sickness insurance, accident insurance and old-age pensions. This became compulsory in 1883. This was a sop to the growth of Socialism in Germany made in the hope that it would check its development. To quote from the Iron Chancellor himself, he said, "Do this without fearing either the sacrifice or the cry of State Socialism. I believe the Socialists will then sound their bird call in vain." The sop was accepted, but Socialism continued to grow and social insurance was adopted in one or all of its phases in 1884.

IN FOREIGN LANDS

It now obtains in the order mentioned in all of the following countries: Austria, Hungary, Finland, Great Britain, Denmark, France, Italy, Spain, New Zealand, South Australia, British Columbia, Russia and Belgium, Cape of Good Hope and Queensland, New Mexico, Transvaal, Alberta, Bulgaria, Newfoundland and the United States for Federal employees, Quebec, Novo Scotia, Manitoba, Switzerland, Peru, Roumania and in forty-five States of the Union from 1911 to 1918. Thus we see

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that in one phase or another it is literally sweeping the world.

The American Association of Labor Legislation drafted a so-called model bill for health insurance which it desired to have introduced in all State Legislatures, which provided for cash benefits equal to two-thirds of the workers' wages for twenty-six weeks. Free medical and surgical service, free nursing, free supplies, free hospitals, cash benefits to dependents, funeral benefits, maternity benefits, free dental care, free medical attendance for dependents, compulsory on all earnings less than $1,000 per year. I appeal to the public of the State of Texas—is it wise to encourage mendicancy, is it wise to load the country with increased taxes to take over the care of the body politic as a State enterprise along so many lines? Do we want another colossal example of Socialism, such as we have seen in Russia? Do we, on the other hand, desire to rob medicine and dentistry as professions of that most valuable human quality—individual initiative—by saying to the dentist and the doctor, "the State will employ you at so much per; you must care for all individuals at so much per diem, as a matter of routine?" Do you for one moment believe that medicine and dentistry will continue to grow if such conditions are allowed to obtain? Experience has taught that where the principal of Socialism is adopted, such growth ceases, individual initiative is lost, and the honored professions of medicine and dentistry will attract fewer and fewer enterprising young men to their ranks, and this dull prospect even now has lessened the number of applicants for admission to the schools of our country for these professions, and the problem of medical and dental education is engaging the attention of the authorities of all medical schools and of the National Research Council, because of the fact that no young men are entering the ranks of full-time teachers of dentistry and medicine because the opportunity for advancement and for earning an honorable livelihood in these fundamental branches offers less financial reward than that obtained by the plumber, the carpenter and the tradesmen.

New Honors for Dr. Whipple

Rochester, N. Y., April 1.—Announcement of the appointment of George Hoyt Whipple, director of the Hoover Foundation at the University of California as dean of the school of medicine, dentistry and surgery of the University of Rochester, was made today by Dr. Rush Rhees, president of the university. The school is being established on a foundation of $9,000,000 given by George Eastman and the General Education board.

DEATHS

At Somerville, Mass., March 19, Dr. George A. Stiles, 71.

At New York, March 14, Dr. Frank S. Wells, aged 78.

At Laurens, N. C., March 15, Dr. Geroge C. Albright.

At Titusville, Pa., March 16, Dr. Herbert S. Orwig, aged 48.

At San Diego, Calif., March 14, Dr. Edgar W. Sheriff, aged 70.

At Montesano, Wash., March 4, Dr. G. H. Wartman, aged 58.

At Reading, Pa., March 21, Dr. Sparkman R. Screven, aged 79.

At Belleville, Ill., March 14, Dr. Robert D. Woelk, 48.

At Albuquerque, New Mex., March 20, Dr. William G. C. Lowry, aged 50, of Clarksville, Pa.

At Waukegan, Ill., March 18, Dr. George Doerbecker, aged 59.

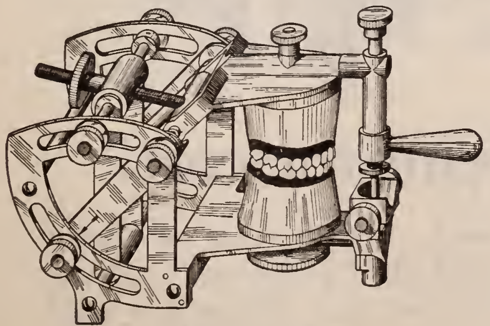
At Springfield, Mo., March 22, Dr. Charles A. Badgley, aged 64.

At Wellesley, Mass., March 28, Dr. Charles H. Smith, aged 73.

At Tullahoma, Tenn., March 14, Dr. J. R. Hart, aged 44.

At Cincinnati, Ohio, April 8, Dr. Shopwell H. Roth, aged 45.

President Harding's physician has been made a brigadier-general. Nothing has been done for his dentist. Perhaps a dungeon will be excavated for him under the White House.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You know that Mrs. Jones could have bought a warm coat for $100, or perhaps less; but she bought an expensive coat because she could appreciate its beauty and quality as compared with others of inferior grade.

She made an investment in appearance and satisfaction.

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Perhaps you have wanted to do finer denture work but have felt that you couldn't "get enough money" for it. But have you really tried?

If you decide the quality of restoration your patient can afford without allowing the patient the privilege of comparison, you often deprive yourself of a better fee and your patient of Trubyte Teeth.

Unless you are willing to ignore the natural desires of the majority of people for better things, as shown in their selection of articles of superior quality regardless of cost, you will grasp the opportunity which lies in Trubyte Teeth.

Remember that Trubyte are the teeth which embody the principle of harmony between face form and tooth form and the true typal characteristics as discovered by Dr. Williams. *"The genuine possess qualities of excellence not found in imitations."*

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Ohio—Rehwinkle

Chillicothe, Ohio, March 11.—Seventy-five members of the Rehwinkle Dental Society and their guests were present at a chicken dinner, given Thursday evening at the Masonic Temple, at the conclusion of the tenth annual meeting of the organization.

President, O. H. Thompson, of Hillsboro, in his opening address, gave warm thanks to the people of Chillicothe for the hospitable manner in which members of the society, attending the meeting, were treated. He appointed Dr. H. R. Clark, one of the veterans of the organization as toastmaster.

Dr. Charles Mills, in discussing the annual meetings of the Rehwinkle Society, spoke of them as "mile-stones in life—where we can renew old acquaintances" and urged the older members to keep up their attendance on such occasions.

Lt. Wilbur Richie, dental surgeon at Camp Sherman, when called on for a short talk, seemed inclined to modesty, and Dr. Charles Mills took it upon himself to explain the magnitude of the work Lt. Richie has been called upon to do at the local cantonment.

Dr. E. W. Martindale, of Columbus, running back over the history of the dental profession, likened the labors of the pioneers in dental surgery to the difficulties of the early settlers of this country. "What we, in our profession, are today," he declared, "is solely due to the work and experiences of our predecessors. Subjected to ridicule, they continued in their research work until today we are dependent upon the result of their labors for all advancements in our profession."

Dr. E. C. Mills, of Columbus, declared Thursday's meeting was one of the most interesting ever held by the society.

He spoke of the difficulty being entertained at Columbus in making complete the files of the Ohio Dental Library, and asked members to be on the lookout for old copies of dental journals, which might come in handy to piece our incomplete files.

Dean H. S. Semans, of Ohio State University, discussed at length various measures of interest to the dentists now up before the legislature. He also spoke of re-organization plans for the state government which are under consideration at the present time.

"Characterizing the Rehwinkle Society as "a good, live society and second to none in the United States," Dr. J. A. Shrofe, of Leesburg said: "I enjoy this association with my fellow workers. I believe that we are keeping up our end and taking our part in life."

He spoke of the self-sacrifice many made in the profession, particularly those in military service, but ended up "that's what we're here on this earth for, self-sacrifice."

Indiana—Wabash Valley

Wabash, March 30.—Sixty members of the Wabash Valley Dental Association met here today for their semi-annual convention and at the business meeting this morning named committees, elected officers for the year and selected Huntington as the place for the fall meeting.

Officers for the year elected this morning are: Joseph Doyle, Peru, president; W. W. Horn, Logansport, vice-president; W. W. Mott, Van Buren, secretary and Dr. Helmer, Kokomo, treasurer.

Committees were named as follows: Program, M. W. Strauss, Huntington; W. R. Meeker, Peru; F. F. Boyer, Logansport and A. B. Porter, Wabash.

Membership, O. L. McKay, Kokomo and Hayden Grayston, Huntington.

Board of Censors, E. S. Hulley, Marion; D. E. Delzell, Logansport and B. F. Mercer, Kokomo.

Necrology, L. W. McIntyre, Logansport, and Jud B. Banks, Kokomo.

Ad Interim, A. L. Harter, Kokomo; N. W. Hiatt, Marion; W. W. Horn, Logansport and W. W. Mott, Van Buren.

Educational, D. R. Garber, Peru and C. A. Preist, Marion.

Covington, Tenn., April 8.—Gov. Taylor has appointed Dr. H. K. Templeton, of Covington a member of the Tennessee State Board of Dental Examiners for a term of three years, beginning March 25, last. He succeeds Dr. R. E. Adams, of Memphis.

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Pennsylvania Odontological Society

Pittsburg, April 7.—More than 200 delegates from Western Pennsylvania attended the opening session of the fortieth annual spring meeting of the Odontological Society, which began yesterday morning. The following officers were elected for the coming year:

W. E. Mendel, Pittsburg, president; H. J. Borner, Pittsburg, vice-president; Leslie Waddill, Pittsburgh, re-elected corresponding secretary; W. D. Moore, Crafton, recording secretary; S. C. Rink, Pittsburg, treasurer; Rea P. McGee, Pittsburg, re-elected editor of the Pennsylvania Odontological Journal, and A. C. Barclay, Pittsburg, librarian.

The following committees were elected: Board of censors, W. S. Cook, C. E. Whitehead and A. C. Young, all of Pittsburg; membership, J. C. Hipple, B. P. Rial and L. W. Ohl, all of Pittsburg, re-elected. The auditing, program, dental literature and exhibit committees will be appointed by the incoming president.

Patents

We wish to announce for the benefit of our readers, that we have become associated with a leading and reliable registered Patent Attorney at Washington, D. C., for the purpose of transacting the patent, trade-mark, copyright and other business of a patent nature.

Our arrangement enables us to guarantee that any matters entrusted to our care which come before the United States Patent Office, will receive prompt, careful and efficient attention at moderate charges.

Kindly furnish us with a drawing or photo of your invention and a description of its construction, operation and advantages, with $10.00; and we will have our attorney make a personal examination at the United States Patent Office, and report whether you can obtain a patent, the cost and manner of procedure.

Please phone, call or write.

THE PATENT DEPARTMENT

THE DENTAL SUMMARY Toledo, Ohio

Gov. Mechem, Texas, has appointed the following to be members of the State Board of Dental Examiners: F. E. Morton, Hurley; J. R. Gaines, Gallup; J. J. Clark, Artesia; C. A. Eller, Albuquerque, and C. C. Clark, Socorro.

Had No Money For Luxuries!

Mother (to boy returning from the dental office): "What did the dentist say?"

Victim: "He said if I hollered it would cost me two dollars; but if I was a good boy and didn't holler it would cost only one dollar."

Mother (anxiously): "Well, did you holler?"

Victim (abused): "How could I holler? You only give me one dollar?"

Hereditary Peculiarities

According to an evening paper the lady who has just become Duchess of Westimnster has "one son, a boy." On the other hand, the Duke himself has two daughters, both girls. —*Punch* (*London*).

Doing Well

"You wouldn't think it, but I've just paid $5,000 in cash for a house, all made by my own pluck and perseverance."

"Really! What business are you in?"

"I'm a son-in-law."—*The Non-Partizan Leader* (*Minn.*).

Watch Your Step

A drunkard of long standing has been reformed by an operation which removed a bone that prest against the brain. The Detroit *News* also reports a number of cures affected by the removal of a brass rail that was pressing against the foot.—*Kansas City Star.*

Complete Directions

"Every man ought to save enough money to buy himself a good, big farm," said the political orator.

"Yes, and then go and do something else with the money," replied a farmer in the audience.—*The Non-Partizan Leader*)*Minn.*)

Classified Advertisements under this heading, $2.00 each for 60 words or less; additional space, 2 cents per word, single insertion; three insertions or more special rate on application.

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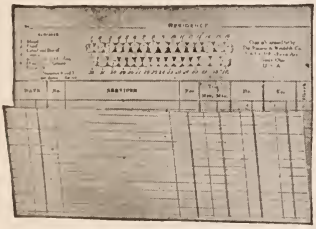

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THE DENTAL SUMMARY
THE MAGAZINE THAT HELPS
Vol. XLI June 1921 No. 6

THE TREATMENT OF INFECTED DENTIN, THE SOLUTION OF THE ROOT CANAL PROBLEM

AN OPERATION FOR MAINTAINING TOOTH VITALITY

BY ELMER S. BEST, D.D.S., MINNEAPOLIS, MINN.

(Written for THE DENTAL SUMMARY)

FOR several years the writer has devoted a great deal of time to studying, developing and advocating better operative methods in root canal work. All efforts in this direction were made because of his belief that a large percentage of root-end infections was due to careless operating, and it was hoped that with root canal operations carefully performed, the occurrence of root-end infection would become markedly reduced. A review of carefully-kept records covering the past ten years confirms this belief. It now seems possible to do this work in those cases where it is distinctly indicated in an aseptic and thorough manner, free from after-infection in so far as radiographic and clinical evidence is concerned.

At no time has the writer advocated the devitalization of teeth. Neither has he ever advised saving teeth infected periapically. The root canal problem has been considerably simplified since adopting the policy of practicing dentistry from the standpoint of the patient's health, by the adoption and standardization of oral diagnosis. This includes dental and general history, complete clinical examination of the teeth and investing tissues, full mouth radiographic examination and study casts. Such a procedure obviously decreases the number of root canal operations indicated. No longer can dentistry be practiced from the standpoint of the individual tooth.

In deciding the extent to which root canal work should be done, there are two facts of vital importance which must be considered. First, "no pulpless tooth can ever be as serviceable and dependable as one with a healthy, vital pulp." Second, "the time consumed in root canal operations, in case the operation is too frequently performed, is out of proportion to the amount of time available when we consider the inadequate number of practicing dentists at the present time." (Records of the writer reveal the fact that the average time consumed in a root canal operation was three hours.)

If there is any available manner of preventing conditions developing that necessitate root canal operations which consume so much time, the following figures recently presented by Dr. Friesell will surely convince one that such conditions should be prevented. Otherwise, root canal work will consume time that should rightfully be given to other things in dentistry, if we are making an effort to use our time to the best advantage. I quote Friesell, *Dental Summary*, April, 1921, as follows:

"According to the best figures obtainable we have a population of 110,000,000 and 44,000 practicing dentists in America, which equals one dentist to every 2,500 people. If every dentist worked eight hours per day, every working day in the year, he could devote only one hour per year to each patient; an amount of time wholly inadequate. Making all kinds of allowances for patients who cannot and patients who will not have dental work done until nature compels them to do so, we need, as a minimum, five times as many dentists as we have to-day.

"Let us consider our prospects for obtaining this supply. In 1908, according to the best figures obtainable, where were 36,823 dentists in this country; in 1920, we have 44,000, showing a gain of approximately 7,200 in twelve years. In that same period there were 29,542 dentists graduated from all of our dental schools. This gives us an average annual graduating class of 2,272, and an annual average wastage of 1,720. In 1908, we had fifty-seven dental schools, 6,919 students in attendance, and a graduating class that year of 1,754. In 1920, we had forty-six dental schools, 9,302 students enrolled, and a graduating class of only 1,042, this being an off year on account of the change from the three to the four year course.

"At the present time we have but forty-five dental schools, with a student enrollment of 12,249, and a senior class of 1,939. If our annual wastage was 1,754 for the past ten years, the increase in total number of dentists will bring it up to approximately 1,900 on our present basis; so that in the year 1920, we did not graduate enough dentists to overcome that year's wastage, by 899. If we graduate every member of the present senior class in 1921, we will just offset the year's wastage, and the same thing will be true for 1922, as our schools have a junior class numbering 1,916 students, being twenty-three fewer than the senior class enrollment."

Careful consideration of the foregoing must surely indicate that we should proceed to eliminate all unnecessary operations in dentistry. Conclusions in this direction would seem to suggest the present as a favorable time for the writer to present an operation which is the result of ten years' development, application and observation, in trying to find a prevention for the "pulpless tooth problem," and a solution of the "root canal problem."

In order that the reader may have an opportunity of coming to his own conclusion in this matter, we here present the result of a review of 1,339 consecutive cases. Of this number there were 600 full mouth cases and, 739 partial examinations. It would be well to remember that these patients are quite representative of general mouth conditions as they exist. They consist of hospital cases, patients who are sick and have infected teeth, patients who are sick and have no infected teeth, (neither of the latter two classes are of the hospital class), patients who are not sick but who have infected teeth and finally those who were perfectly well and had no infected teeth.

REPORT ON CASES—CLASSIFICATION OF CONDITIONS

		RIGHT								LEFT									
		8	7	6	5	4	3	2	1	1	2	3	4	5	6	7	8	Total	%
1. Teeth Missing	UPPER		943 96	947 224	950 160	937 143	834 44	742 75	742 51	762 52	789 84	863 40	947 145	998 170	962 222	953 107	.	12319 1619	12.1
	LOWER		838 166	838 324	838 113	678 53	610 10	615 14	621 14	618 15	610 14	614 7	719 52	819 106	845 202	845 152		10113 1242	12.2
2. Dead Pulps in Teeth with Large Fillings or Crowns.	UPPER		847 26	723 32	790 30	788 38	790 6	667 18	691 13	710 11	703 27	823 15	802 33	778 25	740 34	846 20		10700 325	3.0
	LOWER		672 28	514 31	725 16	625 8	606 4	601 3	606 5	603 4	396 7	607 1	667 8	713 19	643 42	693 19		8871 195	2.1
3. Pulpless Teeth with Large Fillings or Crowns.	UPPER		847 106	723 185	790 207	788 176	790 94	667 154	691 151	710 144	705 138	823 118	802 195	778 213	740 192	846 106		10700 2263	21.1
	LOWER		672 129	514 190	725 149	625 67	606 27	601 18	606 16	603 14	596 13	607 29	667 59	713 136	643 186	693 113		8871 1146	12.9
A. Pulpless Teeth with Periapical Atrophy.	UPPER		847 23	723 71	790 93	788 73	790 37	667 102	691 75	710 67	705 89	823 41	802 84	778 88	740 83	846 30		10700 956	42.1
	LOWER		672 51	514 112	725 61	625 28	606 10	601 12	606 11	603 6	576 8	607 13	667 23	713 57	643 117	693 44		8871 553	48.2
B. Pulpless Teeth without Periapical Atrophy	UPPER		847 83	723 114	790 114	788 103	790 57	667 52	691 76	710 77	705 49	823 87	802 111	778 125	740 109	846 76		10700 1217	54.2
	LOWER		672 78	514 78	725 88	625 39	606 17	601 6	606 5	603 8	596 5	607 16	667 36	713 79	643 69	693 69		8871 593	51.7
4. Vital Teeth with Fillings.	UPPER		847 240	723 123	790 29	788 25	790 50	667 83	691 70	710 100	705 80	823 42	802 32	778 41	740 119	846 195		10700 1229	11.4
A. One-Surface Fillings.	LOWER		672 178	514 61	725 31	625 15	606 9	601 6	606 9	603 8	596 16	607 16	667 26	713 39	643 85	693 204		8871 696	7.8
B. Vital Teeth with Two-Surface Fillings.	UPPER		847 78	723 130	790 119	788 147	790 40	667 35	691 54	710 55	705 47	823 49	802 140	778 108	740 142	846 124		10700 1268	11.8
	LOWER		672 103	514 66	725 126	625 78	606 14	601 4	606 1	603 2	596 11	607 11	667 64	713 122	643 68	693 80		8871 742	8.3
C. Vital Teeth with Three-Surface Fillings.	UPPER		847 51	723 83	790 98	788 71	790 23	667 17	691 26	710 28	705 10	823 29	802 91	778 110	740 81	846 42		10700 760	7.1
	LOWER		672 57	514 76	725 59	625 24	606 8	601 4	606 5	603 3	596 4	607 4	667 18	713 53	643 68	693 56		8871 439	4.8
5. Teeth Impacted.	UPPER	943 57	847 3	723 0	790 3	788 0	790 14	667 0	691 0	710 0	705 0	823 15	802 0	778 1	740 1	846 1	953 65	% on 3rd Molars	6.4
	LOWER	848 59	672 2	514 0	725 2	625 0	606 0	601 0	606 0	603 0	596 0	607 1	667 0	713 2	643 0	693 1	845 70	% on 3rd Molars	7.6

The top row of figures in each line represents the number of individual teeth examined.
The bottom row in each line represents the findings according to the several classifications.

The foregoing statistics reveal the following interesting conditions:

Upper right first molars, of 947 molar regions examined, 224 first molars were missing, 23.5 per cent; upper left, first molars, of 962 first molar regions examined, 222 first molars were missing, 23 per cent; lower right first molar, of 838 first molar regions examined, 324 first molars were missing, 38.5 per cent; lower left first molars, of 945 first molar regions examined, 202 first molars were missing, 22.7 per cent; upper teeth, of 12,319 examined, 1,619 were missing, 12.1 per cent. Lower teeth, of 10,113 examined 1,242 were missing, 12.2 per cent.

Of the upper teeth, 21.1 per cent were devitalized and 42.1 per cent of these were infected; of the lower teeth, 12.9 per cent were devitalized and 48.2 per cent of these were infected; of the upper teeth, 30.3 per cent were filled; of the lower teeth, 20.9 per cent.

An analysis of the conditions of lower first molars reveals a most appalling condition of affairs which can be summarized as follows:

Of a normal number of one hundred teeth, thirty are found to have been extracted (due in all probability to dental caries.) Of the seventy remaining, twenty-three were devitalized (due in all probability to dental caries.) Of the 23 devitalized, eleven have apical pathology, necessitating extraction. The carrying out of rational treatment for alveolar infection therefore reduces the number of lower first molars to fifty-nine. Of these, twelve are non-vital, leaving the number of vital lower first molars forty-seven. Of this number, eighteen have one-, two- or three-surface fillings, leaving but twenty-nine lower first molars out of each one hundred free from restorations. The presence of caries reduces the percentage of normal lower first molars to between ten and fifteen per cent

In the case of the upper first molars, the percentage lost is slightly lower.

To further emphasize; Dental caries has therefore exacted a toll on the integrity and vitality of the lower first molars, probably the most important tooth in the arch, of about seventy-five per cent.

In connection with the above report of cases it was rather interesting to observe that most of the pulpless teeth had large fillings or were crowned. Also, upon enquiry, the patients stated that the majority of such teeth had been devitalized on account of extensive caries. This brings us to a most interesting consideration. We see here the greatest opportunity ever presented to offer some real, concrete help on the "pulpless tooth question."

Obviously, a tooth with extensive caries, almost involving a vital pulp, can be handled in one of three ways:

First, Extract. (This is the way the problem was handled in the early days of dentistry.)

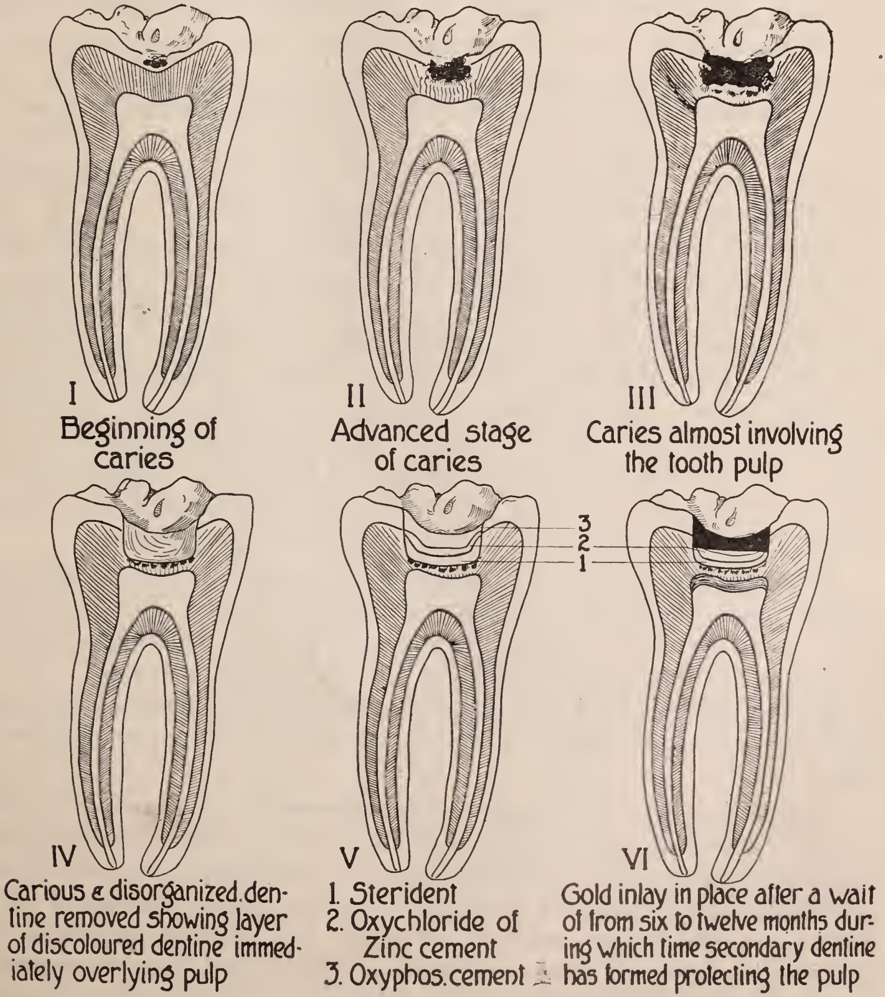
Second, Devitalize. (This is the way it has been handled in more recent years.)

Third, Preserve the pulp vitality and delay the finished operation. (This is the way it probably will be handled in the future.)

The disastrous results of the first two methods need not be further elaborated upon. An operation that will enable us to carry out the third method of treatment is here offered for the consideration of the reader.

As the result of an inspiration the writer received from his esteemed friend, Dr. C. N. Johnson, work was begun, having as its first object the perfection of an operation which would save the pulps of the teeth with extensive caries. An operation was finally evolved that seemed to give the long looked-for results. This operation has been carefully standardized and at the present time its applicaton seems to offer assurance of most encouraging results. While it is advisable that we do not become over optimistic in this connection, the writer cannot refrain from stating that in the case of teeth with extensive caries, the vitality has been retained and the teeth restored to

TREATMENT OF INFECTED DENTINE



I Beginning of caries

II Advanced stage of caries

III Caries almost involving the tooth pulp

IV Carious & disorganized dentine removed showing layer of discoloured dentine immediately overlying pulp

V
1. Sterident
2. Oxychloride of Zinc cement
3. Oxyphos. cement

VI Gold inlay in place after a wait of from six to twelve months during which time secondary dentine has formed protecting the pulp normal function in such a high percentage of cases as to be almost unbelievable. These cases have been kept under observation before any conclusions were drawn. In offering the technic to the profession, it is submitted in a firm belief in its practicability as a permanent operation.

In undertaking the operation for the treatment of infected dentin and maintaining the vitality of the tooth pulp, it must be distinctly borne in mind that this operation does *not lend itself to a sloppy technic.* The same care employed in inserting a gold foil filling must be used. The rubber dam should be placed around the tooth and all overhanging enamel should be broken away. Very cautiously remove the disintegrated dentin, by using *sharp* excavators, cutting the softened dentin in such a direction that the instrument is moving *away* from the pulp instead of toward it. *Keep away from the pulp. It is necessary that this work be done under direct vision, with the cavity dry and well illuminated.* Many pulps are needlessly exposed because of the fact that the operator cannot see his field of operation. *Keep away from the pulp.* Control any temptation to remove the last layer of discolored dentin which immediately overlies the pulp. Success in this operation seems to be determined very largely by preventing pulp exposure. (The operation here advocated is not a "pulp capping.") It is possible to determine from the radiogram the shape of the pulp chamber. This must be ever kept in mind and the radiogram frequently consulted.

When the disintegrated and softened dentin has been removed, but the vital pulp *left unexposed*, a pellet of cotton saturated in a warmed one per cent nuklorene (a form of Dakin's Solution) is placed in the cavity and allowed to remain for five to ten minutes. Following this the cavity is dried. For the purpose of sterilizing the layer of dentin overlying the pulp, sterident is used. This consists of a powder, magnesium, zinc and silver nitrate, and a liquid, pimento eugenol. Its method of application is as follows: Mix the powder and liquid quite thick and place a small particle in the base of the cavity. Gently force this to place with a pellet of cotton or a round burnisher. Be careful to trim it away from the margins.

Following this we apply oxy chlorid of zinc cement. This is mixed to a thick creamy consistency and placed over the sterident. The entire base of the cavity must be covered with the oxy chlorid of zinc cement (Ames.) The balance of the cavity is filled with an oxy phosphate cement. (S. S. W. Silver Cement is used for this purpose.) In some instances where it is necessary to maintain contact with adjacent teeth, a thin veneer of alloy is used.

The tooth is kept in this condition for a period varying from six months to a year, depending on the depth and extent of the cavity, when it is generally safe to place a permanent filling therein. During this time it should be radiographed and tested for vitality. It will be found that these teeth remain in a comfortable condition and retain their vitality. Owing to the danger of losing a pulp being ever before us, no change in any of the materials used was made once they proved satisfactory. For this reason detailed information in this respect has been given. It is not presented as a cure-all for various diseased conditions of the pulp. *It is not a pulp capping.* The indications for its use must be left to the intelligent judgment of the dentist. It is offered as a solution of the problem which has been so unsatisfactorily solved in the past by devitalizing teeth.

In children's preventive dentistry, while our aim is to prevent cavities developing in the deciduous teeth, yet it will frequently be found that cavities will have developed before the parents bring the children to the office. In these cases the operation is somewhat modified, by leaving out the oxy chloride of zinc cement.

This operation is presented to the profession in the profound hope that it will be a material aid in carrying out preventive dentistry by rescuing a large percentage of those perplexing border line cases. *Maintaining function* is infinitely more satisfactory than *restoring function.*

933 Metropolitan Bank Bldg.

INVESTMENT COMPOUNDS AND TECHNIC*

BY K. W. KNAPP, D.D.S., DES MOINES, IOWA

DUE to the fact that success with this method depends to a great degree upon the complete elimination of the wax pattern from the mold, one of the prime requisites for that success is the selection of a proper investment compound. The material selected should have the property of smoothness, for the reason that when the wax is eliminated in its entirety, the gold is cast directly against the pattern chamber walls without an intervening layer of carbon. The surface of the casting will then be a counterpart of the surface cast against, and if that surface be granular so will the casting have a granular surface. On the other hand, if this material has a smooth, fine-grained surface, that surface will be reproduced on the inlay. In the carbonization method the surface of the casting will depend upon the degree of carbonization of the wax pattern, and this is shown by the fact that inlays cast into carbonized molds show surfaces varying from the shining mirror-like ones of under-carbonization, to the rough, etched ones of over-carbonization.

The second requirement for a correct material is that of strength, or perhaps a better word is "integrity." It must have sufficient plaster content to allow the water to wash through it and carry out the wax without picking out pieces of silex, and thus causing a rough, etched surface. On the other hand, it must be sufficiently porous to allow unhindered passage of the molecules of free water to insure the wax being washed out clean. It needs a certain amount of porosity, also, to allow the air to get away quickly when gold is thrown into the pattern chamber, thus preventing air-lock and a consequent rounded margin.

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*The fourth of a series of articles on Casting Technic, written exclusively for THE DENTAL SUMMARY.

It should, also, contain a sufficient quantity of heat-resisting material to prevent checking or cracking when heat is applied, and should *expand slightly* rather than contract during this process. It should hold the free water in such loose combination that, when the heat is properly applied to the ring, these free water-molecules will be driven off so easily and in such abundance that even the largest size wax patterns will be washed out completely, without leaving a vestige of wax in the pattern chamber. Naturally, a material possessing all of these qualities has been rather difficult to find. In fact, I am of the opinion that it is necessary to use *two different compounds*, each one having certain properties best suited for its particular purpose.

In arriving at this conclusion, a series of rigid and rather exhaustive tests were made as follows: First, a molar was carved in ivory, so that its dimensions were nearly twice those of an ordinary molar. A mesio-occlusal cavity was prepared in this oversize molar so that the wax pattern made for it contained as much wax as we ever would have for any type of restoration for a normal tooth in the mouth. A number of wax patterns were made from this cavity, and invested with different materials. These materials were selected from a number of the most popular ones on the market and also various mixtures of different plasters and silexes. The molds were then placed in a device for automatically and uniformly eliminating the wax for a certain definite time, namely, three minutes. The molds were then removed from the ring by sawing around their periphery, and were then sawed through longitudinally, thus cutting through the pattern-chambers and exposing their interiors. The degree of wax elimination and character of the surface was then closely studied so that definite conclusions could be drawn.

It was found that some types of investment compounds on the market would not stand being heated in this manner at all, for the molecules of free water could not get out fast enough, so that they formed steam and blew out pieces of material; in some cases blowing out nearly half. Others seemed to have a fairly free flow of water, but the plaster used in their composition was evidently so soft in character that the wax soaked into it in spite of the washing action of the water. Still others eliminated the water and wax quite readily, but the surface showed an etched appearance, and upon a retest made by carrying a case through in the regular way, proved this by producing an etched, nodular surface on the resultant inlay.

These tests brought out some interesting facts as regards materials for investment for this method. Only a hard-surface plaster will prevent the deposit of a certain amount of the wax on the surfaces of the pattern chamber in spite of the water.

The following table shows results and materials used:

DOUBLE INVESTMENT

Material	Wax Elimination	Surface and Sharpness of Outline
1. Weinstein‘s Cast Clasp	Fair, but shows some traces of remaining wax	Slightly granular, but detail quite sharp.
2. Security Invest. Compound	Poor; showing a film of wax on practically all surfaces.	Quite granular and margins appear rather etched and rounded.
3. Taggart's—Mixed thin	Fair. Wax seems to be out of margins, but deposits on surfaces.	Quite rough and broken in one or two places. Blew out pieces. Graphite disturbed.
4. Taggart's—Mixed thick.	Fair. About same as above.	Rough in places. Looks as though graphite picked out by water. Did not blow in this case.
5. Weinstein's Cast Clasp, boiled out in pan of water.	Poor. Not so clean as by elimination method, by far.	Quite granular. Much more etched than in case No. 1.
6. Kerr's Snow White Plaster	Fair. Only wax film, not thick but distributed.	Very smooth and dense. Margins sharp and all lines clean cut.
7. Clover Leaf Plaster.	Poor. Wax apparently soaked in and evenly distributed.	Quite smooth. Margins and lines fair.
8. Kerr's Snow White Plaster and fine Silex	Fair. About as it appeared in 6.	Very smooth and dense. Margins sharp and lines as in 6.
9. Kerr's Show White Medium Silex	Good. Just a few traces.	Very smooth. Margins and lines sharp. Under lens appear slightly more granular than in 8.
10. Kerr's Snow White Coarse Silex.	Apparently not a trace of wax anywhere in several tests.	Fair only. Appears quite granular under lens. Margins and lines rather blurred.
Inner—Same as No. 8. Outer—Same as No. 9.	Fair only. Castings made showed evidence of wax.	Smooth and dense and lines sharp. Attempts to cast ¾ crowns gave rounded margins.
Inner—Same as No. 9 Outer—Same as No. 10.	Appeared just as clean of wax as in No. 10. Castings show no evidence of wax.	Very smooth just as in 9. Fine margins as in thin ¾ crowns; reproduced sharply and with smooth surface and retained fine markings.

Given this hard plaster, many kinds of silex in combination with it will still allow the wax to soak in. Therefore, the silex used must be crystalline and not amorphous to allow of perfect wax elimination. The proportions of silex and plaster also must be taken into consideration. Thus, a mixture of one-third plaster and two-thirds silex (by weight) may allow a good elimination, but produces a more granular surface and at the same time is liable to check and blow out. On the other hand, two-thirds plaster and one-third silex produce a smooth surface but a rather poor elimination of wax, and a density which will not allow of sharp margins on the castings.

In accordance with the experiments made, therefore, a method of double investment is earnestly advocated for best results. The wax pattern itself should be thoroughly coated with a material composed of approximately even quantities of a hard plaster and medium ground crystalline silex. This will give a surface to the matrix chamber which will be very smooth, is dense enough to prevent nodules, and yet sufficiently porous to allow the escape of air. The water passing through will not etch the surface because of the inherent strength given to it by the comparatively high plaster content, and if heated as will be described later, it will allow a casting to be made into it which will fit very accurately and have sharp margins and fine carving lines reproduced faithfully. The second or outer material is composed of the same plaster and a coarser silex, with the silex content greater than the plaster. This is used for the purpose of allowing a large quantity of excess water to freely pass through it, and wash the pattern. chamber free of wax, to provide plenty of avenues for air escape, and to possess enough expansion to follow the ring when it is heated, without cracking or checking.

This particular combination has been tried out thoroughly and has given and is giving the best results I have been able to attain so far.

TECHNIC OF INVESTING THE PATTERN

After the wax pattern has been mounted on the sprue former, as described in the preceding article, it should be invested *immediately* to prevent any changes. If we are to expect accurate and uniform results, we should perform every one of the different laboratory steps in a certain definite way every time. If this be done there is no reason, except for "the personal equation," why we shouldn't get one hundred correct inlays for every one hundred correct wax patterns. Therefore, the safest thing to do is to eliminate the personal equation by having these laboratory steps done automatically, and as much by applicances and machinery as possible. In the matter of investing, for instance, definite proportions of water and material should be used and the same routine followed in every case.

If the wax pattern was made in the mouth with the saliva as a lubricant, the pattern should be washed simply by a stream of room-temperature water from a water syringe. Then put thirty-three minims of room-temperature water in a small, clean, rubber plaster bowl. To this add two drops of a saturate potassium sulphate solution.

I have made a number of experiments using this as a hastener and again not using anything, and I can find absolutely no harmful effect in thus hastening the setting. If time is not a factor, it need not be used, of course; but if it is, why waste any more time than is necessary in just waiting for an investment material to set?

Now, due to the fact that silex and plaster do not have the same weight, it is possible in shipping material of this kind that there takes place a settling of mass in such a way that the ingredients are not mixed as they were when they left the factory. Therefore, it is advisable to thoroughly remix an investment compound by pouring it out into a clean receptacle and stirring thoroughly, then replace in the container and when not in use keep the cover on to prevent atmospheric conditions exerting an influence upon it. Dip an ordinary sized tea spoon into the freshly stirred No. 1 or inner investment compound and pick up a heaping spoonful. Then place the edge of the blade of a plaster spatula at the heel of the spoon and slide it along the rim of the bowl of the spoon till it reaches the tip, thus taking off all in excess of an exactly level spoonful. Empty this into the water in the bowl, and mix just sufficiently to produce a smooth, creamy mixture. Spatulation is not indicated for this method as a long spatulation prevents the release of the water molecules, and thus poor elimination of the wax is the result. Carefully paint the cavity surface of the pattern with the mixture applied by means of a fine sable brush, working it carefully into sharp angles and corners, and then blow the material so that it settles closely to the pattern in every part. Follow the same plan on all other surfaces, and then add more material and blow and continue until all surfaces and margins are covered with a coating, about a thirty-second of an inch thick. In short, build up a little ball of material completely covering the pattern. If the hastener was added it will be necessary to make every move count, as it will set quite rapidly. A more accurate mixture may be gotten by weighing the material. If this plan is followed, the correct proportions are thirty-three minims of water to three pennyweights of material.

This first investment is allowed to set until the residue in the plaster bowl will break with a clean, sharp fracture when tested between the fingers. When the hastener is added this will normally take place in ten minutes. The kind of water used and other conditions may cause a variation in the setting-time so that the best procedure is to find out the setting-time by using the fracture-test for the first two or three times the investment is used, and when that time is once determined, make use of an interval-timer for convenience. This timer can be set for the proper number of minutes, and then the dentist or assistant may do other work with a free mind, until the alarm sounds.

The invested pattern is now dipped into water to insure a firm union with second investment, and placed to one side. Put 250 minims of water in a clean bowl and add five drops of the potassium sulphate solution. To this add three level table-spoonfuls of No. 2—outer investment material—and mix as before, using only so much spatulation as is necessary to put it together and make an even mix. If more accurate results are wanted the correct weight is twenty-eight pennyweights of material to the amount of water given above. This should give a mixture sufficiently stiff as to make it difficult to pour it around the pattern as is ordinarily done. The process is therefore reversed by setting the investment ring on a glass slab, and then filling the ring with the thick mixture, passing the spatula blade up and down in it to release any air pockets that might otherwise be formed. Then grasp the sprue former between the thumb and first two fingers in such a manner that the invested pattern is pointing directly downwards. Gently settle the invested pattern into the No. 2 mixture with a trembling or shivering motion, so that it will flow evenly and smoothly all around the ball of No. 1 material without trapping any air. Continue this until the sprue-former is nearly in place on the ring, and then press it straight in position so that the upper edge of the ring fits the flange on the sprue-former.

Another method is to fit the ring firmly onto the sprue-former and with the pattern pointed upward, fill in the No. 2 mixture with the aid of the spatula until the ring is about half full, then vibrate with a serrated handled instrument until it settles evenly. Add more of the mixture and vibrate until the ring is overfull and then level off with a spatula. Let set until the residue will fracture cleanly, which will take approximately ten minutes as before. When the correct time has been established use the interval-timer as a matter of routine.

It will be found upon trial of the proportions given that both first and second mixes are considerably thicker than those ordinarily used. In the case of the first investment there are two reasons in favor of the thicker mix. If a thin mix be used, there are relatively more molecules of water than in the thick mix. These molecules of water become spaces or, in plain words, holes, when the mold is thoroughly dry. When the gold is cast, it naturally enters these holes and forms a multitude of little nodules on the surface of the casting. This makes the whole casting thicker, or we may say swollen, in accordance with the number and length of these nodules. As a result the casting will bind when placed in the cavity, and in the case of complex castings will not allow the inlay to seat perfectly. The thicker the mix the fewer molecules of water are present, and therefore the fewer nodules and consequent better fit.

The second reason for the thick mix is that of strength. The crushing strength of a thick mix of this material is much greater than that of a thin mix. In the case of a large inlay with considerable bulk in the wax pattern, especially if the sprue hole be as large as is used here, the force exerted by the impact of the molten gold against the pattern-chamber walls is considerable, and so strength is a factor to be considered.

Another reason for using an inner investment is the opportunity provided for the elimination of air bubbles at the same time that we give greater strength by using a thick mix. If the pattern be carefully painted and blown so that no bubbles are present, and then a protective wall built up around it, it makes no difference how many small bubbles there may be in the second investment, for they cannot get into contact with the wax pattern itself. The second investment is mixed thick for the purpose of strength primarily, for surface is immaterial.

I find it an advantage to make a slightly thinner mix of the inner investment in the case of three-quarter crowns, with their long, paper-thin margins, for cast clasps, saddles and denture bases. In the case of an ordinary inlay, we have relatively thick, blocky masses of wax, terminating in sharp margins.

The chance for the air to get away freely in these cases is ample, even when the investment is mixed thick, to enable us to reproduce perfectly these sharp margins. In the case of the thin three-quarter, or one of the other types mentioned, this chance for air escape is greatly lessened. By using a thinner mix, therefore, we can provide greater porosity and thus greater air escape. In these cases, also, we do not get the pressure against the walls caused by impact of a large mass of gold because of the relative thinness of the pattern-chamber itself. Therefore, we can afford to sacrifice some strength in favor of greater porosity.

In these cases, then, use thirty-six minims of water and two drops of potassium sulphate solution to one level teaspoonful of No. 1 investment.

For convenience in making the No. 2 mix, I would suggest that a regular preparation bottle, such as the S. S. White, which holds just 250 minims when level full, be used as the receptacle for quickly picking up the correct amount of water. The correct amount of material can be weighed out on the gold scales and put into a small paper sack; about one hundred of these can be weighed out at a time and then placed in a covered tin. It is then only a matter of a minute to pick up the correct amount of water, put it in a bowl, add the hastener if desired, and pour in the contents of a paper sack. If larger cases are to be invested, greater quantities of water and material are used in proportion.

I firmly believe that only when some definite method of accurately and uniformly using investing materials is practiced faithfully, our inlay technic will come into its own. If this one doesn't appeal, at least try out one equally accurate, and I am sure the results will justify the extra effort.

Utica Bldg.

MOUTH CONTOUR CLEANSING*

BY HENRY BARNES, D.D.S., CLEVELAND, OHIO

CONTOUR BRUSHING is a comprehensive term. It conveys the idea of the necessity and possibility of efficiently and mechanically cleansing of all the approachable concave and convex surfaces of the mouth, teeth and tongue.

Under absolutely normal conditions, brushing may be said to be unnecessary. But as our mode of life is abnormal and tends to produce a filthy condition of the mouth with resultant ill health, we have felt compelled to resort to artificial cleansing as a preventive and curative agent.

Artificial cleansing has consisted of varied and indefinite tooth-brushing methods including the use of strong chemicals, abrasives, floss silk, rubber, picks and various agents. Included in this is the interim treatment by the dentist and the interim conscientious abuse by the patient.

We have made mistakes in assuming that brushing by any previous method could properly cleanse the oral cavity; and this failing, we resorted to the use of strong chemicals, monthly scaling and polishing of the teeth. Can it be said that success has followed these practices?

Our idea of the necessity for artificial cleansing was and still is correct, but our technic was faulty in that it destroyed tooth and gum contour.

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*Read before the Ohio State Dental Society, December, 1920.

Large and stiff brushes with the faulty technic of to-and-fro, horizontal or plane brushing, circular, rotary, oval or arc brushing, and of up and down brushing, all limited in their action, produced definite destruction of gum and often tooth contour.

The dental profession is somewhat aware of the damage to tooth structure wrought by abrasives, but is not generally cognizant of the great damage produced by large and stiff brushes and faulty brushing.

Recognizing the variety of contours with which we have to deal, and the fact that the function of dentistry may be said to be the conservation, restoration or imitation of natural contour, with all that these imply, the writer has developed a brush technic which he believes is quite in harmony with the function of dentistry as expressed. Hence the term "Contour Cleansing."

It was evident that brush bristles acting on surfaces at right angles to their long axes could not equally cleanse contour surfaces, and the larger the brush and the stiffer the bristle, the lesser the efficiency and the greater the injury to gums and teeth.

It became evident by experimentation that brush bristles acting at about a thirty degree angle to the brushed contour surfaces, through the flexation of the bristles would cause the ends of the bristles to act as a chisel, which could mechanically cleanse all approachable surfaces without abrasion of the teeth, provided the bristles were first softened with hot water, also keeping them in water between brushings, or they may be covered with soap.

The first experiments were made with large, stiff-bristled brushes, which were trimmed to approximate the tooth contours. From time to time the size of the brush was reduced until finally in early 1915 the small, one-row stiff-bristle brush was adopted, because it proved to be the most efficient.

The small brush could work in smaller places. It produced less muscle tension in action, and with the thirty degree angle of the bristles, more than one row of bristles was unnecessary and detrimental. The small brush is also very efficient in cleansing mesial and distal surfaces where extractions have been made. The single row of bristle clusters is more easily kept clean than brushes with multiple rows. Cleansing of the brush is exceedingly important.

The brushes are called "pick brushes," because they actually pick out the food lodged within the interdental spaces, and to do this it is imperative that the bristles be forced into these spaces, using a wiggling, jiggling or rocking action. This is the reasonable method to thoroughly cleanse the interdental contours.

THE LINGUAL BRUSH

The chisel, squeegee and massage action of the bristles necessitated the lingual brush, with practically the same bristle action on lingual contours. The lingual brush was then evolved with a short transverse row of bristles pointing from a sharp curved handle end, and essentially paralleling the handle. This brush has also a curve at the other end to facilitate holding.

The lingual pick brush is used by holding the curved end of the handle with the thumb and forefinger and by a jiggling action upon the gums. This will cleanse all the lingual contours including the condyles. This may be compared to a raking action except that the bristles parallel the handle. This brush may be of one row of stiff bristles or of two rows which converge at their ends which is practically a one-row brush.

TO START CONTOUR BRUSHING

Take the brush kept in water or soap water and soften in hot water. Hot water is preferable from spigot as it will be needed to clean the brush frequently during each brushing. Dipping brush into a glass of water is filthy because it is literally trying to cleanse the mouth with its own debris.

A pivotal hold is made with the tips of thumb and forefinger on handle close to bristles, other fingers acting as guides, motors and brakes. For a right-handed person, the left side is brushed with the brush held as though it were a pen or pencil. The bristles point down on upper arch and up on lower arch.

To brush the left side the brush is turned in the pivotal fingers and brought around so that it now occupies a position ninety degrees from that of the penhold. Bristles pointing towards you.

Lay the side of the brush high on the upper gum, bristles pointing down and flex to an angle of about thirty degrees with the gum. Then with an arm and shoulder motion, stroke down and in with a little more pressure to force in, and also with the jiggle to thoroughly cleanse. This picks the debris from the interdental spaces.

This causes the flexible bristles to act as flexible chisels which scour and massage and squeegee the gums. Debris is squeegeed from the gums and from under the free margins of the gums and from pyorrhea pockets on the tooth surfaces from which it is chiseled and carried away by the bristles. The sides of the bristle clusters also act as a massage in the interdental spaces. Also they serve to give the concave shape to their gum surfaces for the proper sluicing of food during mastication.

The motion should be comparatively slow to give the bristles time to flex and follow contours from gum to tooth and interdental contour. The slow flexation of the bristle chisels into the interdental spaces with slight additional pressure down, in, through and back repeatedly, has been well expressed by Dr. Hartzell with the term "jiggle." The writer has used and taught this action since 1911.

The characteristic positions of teeth and their spaces is vertical. Therefore the essential movement to produce the proper action of the brush must be vertical. There also must be such a brush-hold as will permit a compensating action of the brush, hand and wrist to follow the contour of the dental arch. This brush-hold must be flexible, not rigid. The brush should be held by the fingertips, not in the palm of the hand.

In all the brushings the bristles do not leave the surface but are carried down and up on the upper jaw, and up and down on the lower jaw; the brushes sliding back have only a gentle massaging effect without injury to tissue, soft or hard.

The brush should be rinsed frequently in running hot water to cleanse, and bearable hot water should be used to squiggle within the mouth to dislodge small particles of debris picked out in brushing.

Forcing the bristles into the inter dental spaces at right angles to the surface will cause the gums to be flattened on their interdental apices. These gums will be healthy but will not afford the natural sluice-way to deflect the food during the act of mastication.

To insure a correct technic and prevent conscientious abuse at home, there should be as frequent visits to the office as may be found necessary for inspection and correction, to correct faulty technic.

The patient may believe that he is following the correct technic whereas the office observation may prove otherwise.

SHORT GUMS

When the gums are short and the frenum high on the lower jaw, a small soft-bristle brush of two or more rows is recommended, using the rolling method to massage the gums and following by the one-row bristle brush to cleanse the spaces.

Very irregular teeth will require a little deviation from the action used where regularity exists.

The gums will form themselves about the teeth in the direction of the pressure applied by the brush in the act of cleansing. Extreme pressures are to be avoided if natural approximation of gum restoration is desired.

INTERDENTAL BRUSHING

Interdental brushing is a limited term and applies only to the interdental spaces, whereas contour means this and much more.

GINGIVAL PYORRHEA

Gingival pyorrhea is that pyorrhea which commences as gingivitis followed by spongy gums and finally pockets within the alveoli. This may be caused by non-brushing, faulty brushing, malocclusion or other injuries influenced by diet and systemic conditions.

Filth is a prolific cause of pyorrhea. Dr. T. B. Hartzell has very appropriately called this filth bacterial filth, or mold.

Pyorrhea is impossible in a mouth cleansed by a method as given. Pyorrhea already existing will in many cases be eliminated provided the method is persistently followed.

Within the limits of this short paper, it is impossible to consider more than a few of the important items pertaining to this subject. For further information, I suggest that a paper read before the Northern

Ohio Dental Association in June, 1916, and published in THE DENTAL SUMMARY of December, 1916; also a paper read by Dr. Hartzell at Indianapolis, and published in THE DENTAL SUMMARY of September, 1920, be read.

I am greatly indebted to Dr. Varney E. Barnes for the term "contour" which so adequately and comprehensively describes the method.

NOTE:---My inventive conception, in so far as I am aware, differs from all previous disclosures, not only in structural detail, but also in the theoretical principle of its use. Consonantly, it establishes novel means for more certainly insuring the dislodgment of all matter, notably deleterious particles of food, from between the teeth. As contra-distinguished therefore from the brushing process quite generally in vogue at present, my conception deals rather with the pushing through and withdrawal of the bristles from the intervening spaces of the particular set of teeth to be cleaned. This may be accomplished * * * by rocking or tilting the bristle tips of the brush upon the outer contour of the teeth. * * * A tilting or rocking movement is imparted to the handle whereupon the bristles may be first forced through the space between these forward teeth. * * * This movement contrives to loosen if not at once dislodge whatever foreign matter chances to have become seated between these teeth. Thereafter the tilting is set up in the opposite direction and continued alternately back and forth until all the pyramidal clusters have become wedged in the respective tooth intervening spaces. * * * In this way the teeth actually are cleansed where decay is most apt to occur.

The above note is a quotation from my application for a tooth-brush patent filed December 23, 1911. The method is not patented. It is my sincere desire that the method be used fairly by the profession and laity for the good it will do. The method can be used to greater advantage by others, and smaller brushes than the one patented. The method registered in the U. S. Patent Office simply establishes my authorship and priority use. HENRY BARNES

STRUCTURAL CHANGES WITHIN THE PULP CANALS OF TEETH FOLLOWING PARTIAL PULP REMOVAL. (PULPOTOMY)

BY WALLACE CLYDE DAVIS, B.SC., M.D., D.D.S., LINCOLN, NEB.

SOME years ago Dr. Charles Mayo, of Rochester, Minnesota, stated at a Medical Association Meeting in Chicago that "The next great advance in medicine would be made in Dentistry," and that the responsibility rested upon the dentists, and "Will they make good?"

The publication of this address created world-wide attention, and gave great impetus to research relating to infection about the teeth, and its effect upon the general health.

It was proven and generally accepted that there existed a distinct relation between foci of infection of oral origin and many general disorders.

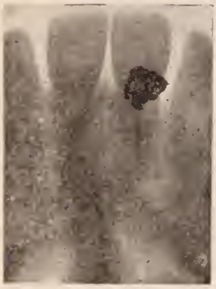

Fig. 1

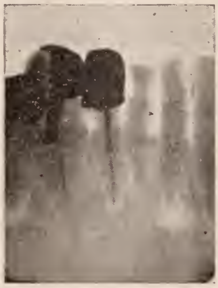

Fig. 2

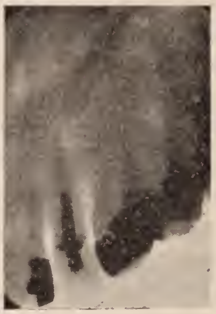

Fig. 3

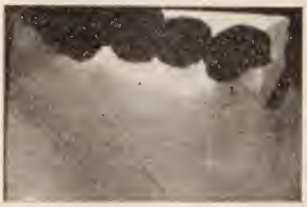

Fig. 4

The roentgenogram became the chief agency of reliance, in discovering the conditions about the roots of teeth favorable to the development of bacteria.

Very soon it was clear that a large percentage of the teeth, from which the pulps had been removed, was involved and harbored infection in subdental pathological tissue and spaces. Many dentists and physicians in practice and research gave the subject special attention.

According to these investigators, all pulpless teeth must be radiographed for indication of granuloplastic areas. (*Figs. 1, 2, 3 and 4.*) The disposition of those found to be diseased is still a disputed question, even among men of repute, both medical and dental. Some contend that a large number of these teeth are amenable to treatment, while others insist that few infected cases can be saved from the forceps with safety to the patient. Those of the dental profession who have not investigated the subject, or do not care to give the time necessary for investigation, are applying the principle of "Safety first," and advise extraction of all pulpless teeth.

During recent years, much has been done in checking up the research of others in matters related to sub-dental infection, from which it would seem, contrary to the opinions of some, that the problem is not one of bacteria alone, since healing will not occur until the necrosed cementum is removed.

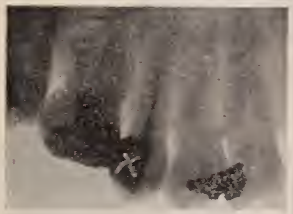

Fig. 5

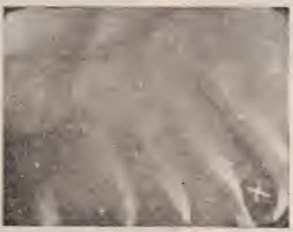

Fig. 6

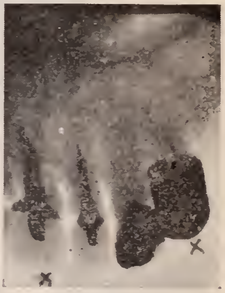

Fig. 7

The question of the elimination of detached and generally necrosed cementum is of major importance and should always be considered. Out of one thousand consecutively extracted putrescent teeth, eight hundred and eighty-eight revealed dead cementum, and the preliminary step to reattachment of the peridental membrane had not been taken. The remaining one hundred and twelve cases showed complete attachment of the peridental membrane external to the canal with no evidence that it had ever been previously detached.

While engaged in this work the problem with which this thesis deals presented itself. During the year of 1917 and 1918, the writer reviewed some four or five thousand roentgenograms of pulpless teeth. Occasionally there would be one in which the sub-dental tissues were as clear and distinctly normal as were the tissues about the adjacent teeth, the pulps of which were known to be vital.

It was also noted that the majority of the pulpless teeth showing normal sub-dental tissues, had a pulp canal filling which did not extend to the apex of the tooth by one, two or three millimeters, and in some instances had no root filling whatsoever. (*Figs. 5, 6, 7, 8 and 60.*)

In addition to this, we radiographed over one hundred of the root fillings we had personally made over a period of twenty-five years. In twelve of this number we had unintentionally failed to reach the apex. (*Figs. 9, 10, 11 and 12.*)

At the time of radiographing these, there was no evidence of disease of the sub-dental tissues. Each of the patients gave a history of entire comfort as far as the individual tooth was concerned over the period he had carried this partial root filling. We found the carefully kept card system of service at this time, as it disclosed the fact that each of these twelve cases had been a surgical case. The pulp had been removed under an anesthetic; gas, somnoform, nerve-blocking, or pressure anesthesia. No devitalizing agent had been used in any one of the cases.

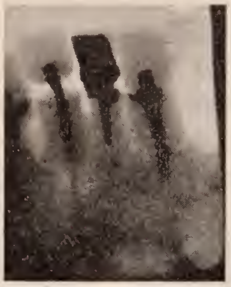

Fig. 8

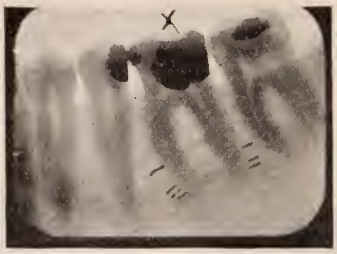

Fig. 60

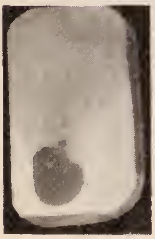

Fig. 9

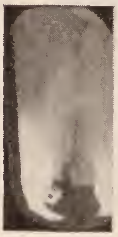

Fig. 10

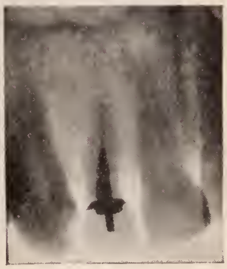

Fig. 11

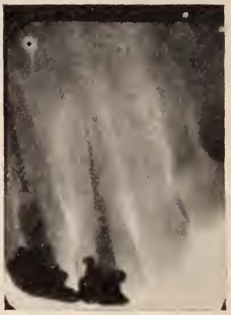

Fig. 12

In all cases of partial pulp canal filling, with an absence of rarefied areas, there seemed to be an obliteration of the pulp canal from the end of the canal filling, or near this point, to the apex. It was also noted that the periapical bone space seemed to be entirely obliterated or materially diminished.

PROBLEM

The problem, therefore, was "What are the structural changes in the apical portion of a pulp canal following surgical amputation and removal of the crown-wise portion of the pulp, and the more practical problem of, Under what conditions and under what methods of procedure do we most frequently have these changes?" A search of the dental and medical literature disclosed very little of direct assistance in the solution of the problem: however, the investigations of others in subjects germane, have been of help in answering questions, temporarily at least, of problems collateral with the work.

Dental literature since its inception is replete with the writings of those who from similar experiences have found either mechanical obstruction, or indications of vital pulp tissue beyond a partially filled pulp canal.

The writers report these conditions so frequently found, that special citations to this clinical experience is unnecessary. However, in general, they chronicle the fact that upon the removal of a filling from a partially filled pulp canal, they have frequently found an "obliterated pulp canal" or "an extremely sensitive tissue" seemingly indicating and generally accepted as pulp tissue.

When obstruction in the canal has been encountered under the above condition, and this obstruction has been found several millimeters crownwise from the apex, the obstruction has been attributed to the activity of the odontoblast.

In the earlier dental literature is found very little of direct bearing on this subject, as few have recorded much investigation, limiting their publications to simple statements of facts relative to isolated cases.

These cases have not been associated with surgical amputation of the pulp (Pulpotomy), and must only be regarded as relative to the problem. However, they have been of assistance, and are here reviewed.

Dr. I. B. Branch[1] in 1851, reports a case of a tooth "broken off by the kick of a horse and end of the fang closed up with osseous matter," etc. Dr. Branch did not publish photographs or otherwise make it clear as to the tissue which was responsible for the closing up of this pulp canal. If it was the product of the peridental membrane, the case would have very little to do with this problem.

If the new structure was formed by transformed pulp cells, it is of interest in this connection. Dr. Charles S. Tomes,[2] in his book, "A System of Surgery," second edition, page 452, (*See foot note*) reports a case similar to that of the one reported by Dr. Branch in 1851. However, Dr. Tomes states that in this case the repair tissue was "dentin," (the product of odontoblasts). This case is, therefore, only remotely related to this subject, but serves to illustrate the willingness of the pulp to create reparative tissue.

Dr. Tomes states regarding an unmagnified picture of the roots of this tooth as follows: "Shows the roots and neck of an upper molar tooth; the crown had been broken off in attempting its extraction.

"Sometime after, the roots were removed and it was found that a mass of secondary dentin protruded from, and over-lapped the margins of the remaining portion of the pulp cavity, etc." No micro-photographs were shown. It is not stated that slides of this case had been made. It may be possible that this new tissue was osteoid tissue rather than dentin.

Dr. W. W. Cadman[3] in 1851, writing of his clinical experience in capping pulps, exposed, near-exposed, and those from which the horn had been cut, states, "My principle is to excite ossification as surgeons sometimes do to fractured bones when indolent, and I have succeeded in doing it in many cases where the dental pulp is healthy even though wounded." As no slides are shown, it is not clear as to the structure here produced. In closing, Dr. Cadman writes: "Twelve years of experience in this operation has proven this fact to me, that under favorable circumstances it can be done."

Dr. Harry S. Chase[4] in 1868 describes the process of calcific changes in the pulp quite thoroughly. He says, "The process of hardening is effected in three ways, namely, by calcification, ossification and dentification. The great mass of the pulp is histologically connective tissue."

"Now when a pulp is to be calcified, it is not merely infiltrated with lime salts; veins, arteries and nerves are not merely petrified, and thereby converted into bone. But veins, arteries and nerves are differentiated by the power which presides over the process, and the whole are converted into simple connective tissue cells. After this conversion, and during the process, the lime salts are taken up by the cells and packed into the interstices between them, and are also retained by the cells in large quantities. This is accomplished by the action of the cells which take up the salts from the plasma of the blood, those nearest the blood giving it up to those most distant, passing them from one to another by osmotic action until the one most distant from the blood vessel has received an equal share, with that which is in close proximity to the source of the supply."

"When a pulp is thus transformed it is neither dentin nor cementum. Neither is it bone; it is only calcified connective tissue. This is what I mean by calcification of the pulp." That which follows is of direct connection and interest.

Dr. Chase continues: "Ossification of the pulp, or of any other tissue is not a mere hardening by lime salts of that tissue. There can be no true bone without bone corpuscles or bone cells. This takes place by a shooting out from the sides of the connective tissue cells of little processes or tubes which anastomose or communicate with those of adjoining cells, and thus furnish a means of communication through every portion of the pulp. These cells and prolongations are for the calcification of the liquor sanguinis or plasma of the blood which must furnish the lime salts for the hardening process. The salts of lime are first deposited in the intercellular spaces. They are packed with it, but the cells themselves are not stuffed with it until they are a solid mass. They retain more or less of these salts in their cavities and sometimes become very small in capacity in consequence of it, as may be seen in the teeth of very old people, or those which are of a very solid texture. In the same specimen we often see a very great difference in the size of these bone cells, owing to the filling up of their interior."

Dr. S. J. A. Salter[5] in 1874, writes very clearly of the final step in complete closure of the canal through the formation of osteoid tissue. He says: "The blood vessels in the axis of a system of osteo-dentin usually remain open; but occasionally, and indeed not very infrequently, the central canal can no longer be seen. It is obliterated by the calcification of the blood vessel and its contents, and its position is occupied by an indefinite semi-transparent structure."

Referring to osteo-dentin, he continues: "It may contain true bone lacunae, especially resembling those of the crusta-petrosa."

Mr. D. E. Caush[6] of Brighton, England, in a paper, August 17, 1893, at the World's Columbian Dental Congress, states that the subject had been under observation about five years at that time. Mr. Caush seems to associate the building of this new tissue as connected only with the diseased condition outside of the canal and affecting the cementum of the root. He believed the newly constructed tissue had been preceded by canal enlargement. He says, "The canal was also much enlarged and it was observed that frequently in different directions the contour of the canal varied much, as the excavations may extend over a very small portion of the canal, or they continue at any given direction until a second canal is formed, frequently passing out at right or acute angles to the original canal, continuing until it has passed through the dentin into the cemental tissue."

It is quite evident that Mr. Caush did not appreciate or was not aware at that time that more than ninety percent of all roots are possessed of two or more foramina, contructed in the tooth at the time of its formation.

Our own findings prove that a root with a single foramen is the exception to the rule. This is most conclusively brought to our attention by Dr. C. J. Groves[7] in an article, "Some causes for periapical infections with the pathology." He gives the percentage as thirty-five to ninety-five. It would seem that a microscopical study of these same teeth after sectioning would show a general average above ninety-five percent. Continuing Mr. Caush[6] says, "In all cases where this change has taken place, the margins of the canals show a more or less irregular edge produced by the semilunar excavations of the dentin. The definite termination of the dentin as seen in the pulp-canal of an ordinary tooth, has given place to the indefinite, and irregular margins are produced."

It must be borne in mind that all these cases shown by Mr. Caush are teeth in which a canal filling had not been attempted and showed a diseased condition external to the cementum. To us this means infection.

Mr. Caush's work is here given such extended consideration because it establishes the fact that these changes do take place even under adverse circumstances. However, that the formation of this osteoid tissue is always preceded by canal enlargement is disproven by our collection of slides of cases with partial canal fillings.

Continuing Mr. Caush says[6] "If, as is often the case, these teeth remain in position after the excavation has been produced, a second change more marked even than that of the excavation oftentimes follows, for in these depressions it is not at all unusual to have a deposit of new bony tissue, entirely different in microscopic structure from the dentin which surrounds it. In this new tissue we have no tubuli radiating to a given center as in the ordinary dentin, but in place we have a number of lacunae and canaliculi, in character similar to those found in true cemental tissue. This tissue does not appear to be true bone as it is very unusual to find any true Haversian system, even where there is comparatively a large amount of the new tissue deposited."

"The lacunae as seen in this new tissue are irregularly placed, as seen in the thickened cemental tissue, and vary much in number and position. They may be very closely packed with short canaliculi, or they may be scattered throughout the substance of the tissue and have canaliculi of some length joining two or more of the lacunae together."

"As to how these changes are brought about is a subject of great interest and study, and we will do well to consider it carefully. The irregular margin and semilunar character of the edges gives us a clue and shows at once there must have been an absorption in a greater or less degree according to the amount of change which has taken place."

"This absorption may have commenced at different points of foci along the margin and gone on spreading until the whole of the margin is acted upon, or it may commence all along the edge of the canal at the same time."

"It is evident (microscopically) that such an edge could not be produced by the addition of new tissue alone, as in case where secondary dentin is deposited either as dentin of repair, in those cases where caries have almost penetrated to the pulp canal, or as a result showing repair following accidental penetration of the pulp canal during the operation of preparing a cavity for filling, or as a result of pulp calcification, for in either of the enumerated cases the microscopic structure of the tissue is quite different."

"In all these cases the new tissue is always added directly to the old tissue without any excavations or absorptions of the margin, and the secondary dentin is deposited directly from the odontoblastic layer of the pulp. It would appear then that these excavations and this new tissue, cemental in character, could not be produced directly from the odontoblastic layer of the pulp in health, for we have seen under such circumstances, should there be any deposit it would take the form of secondary dentin or pulp calcification."

This extended quotation of Mr. Caush has been made because it was the first real investigation of a phase of this subject akin to the work here done. Continuing Mr. Caush says "On examining such teeth the first thing to which our attention will be drawn is the thickened condition of membrane" (referring to the peridental membrane) "and it may appear two or three times as thick as it would appear in health, and in certain places under the membrane we may frequently find excavations going on and giant cells in position; again in another place in this root we may find some older excavations and a layer of new tissue filling up the excavations and increasing the size of the exostosed tooth by the additional tissue formed; in fact, the three stages of development of cemental tissue in exostosis."

Mr. Caush[6] shows several microphotographs which fully illustrate his findings, in cases associated with peridental disease.

Dr. Arthur Hopwell-Smith[8] in his book, "Histology and Patho-Histology of the Teeth," published ten years later, deals with pulp-canal changes from an entirely different stand-point; that of "Injuries to the dental pulp." He shows no cuts indicating he had considered cases of pulp calcification following surgical amputation and partial canal filling; however his research is of great value in this connection. It sets forth the facts related to pulp repair following surgical trauma in the absence of infection and destructive drugs.

Writing of the dental pulp he says: "It is not at all surprising that this is a tissue which possesses great recuperative powers, and is constantly exercising its functions in this respect by undergoing repair. Very seldom, indeed, can a lesion of the soft or the hard parts of a tooth occur without a corresponding attempt—more or less successful—on the part of the pulp to ward off the attacks of the enemy. For in the exercise of its highest functions it is concerned with the maintenance of the vitality of the tissues in the center of which it is placed. Hence any invasion by disease, or the occurrence of an accident is succeeded by a resistance which in many cases is highly satisfactory, and the tissues are not devitalized. Probably nearly every dentinal change is accompanied by some healing process of the pulp."

"The restoration to a normal condition of pulp lesions partakes of the characteristics both of those of the soft parts, like a wound of the skin or other vascular tissue, and those of bones, as in the case of fracture. Instead of a permanent or definitive callus being formed in the pulp cavity, the conditions are modified through the anatomical peculiarities of the part: and, as a result, the various kinds of adventitious dentin, already fully described, occur. It is unnecessary to lay stress on the fact that here, as elsewhere, the process is essentially similar. Osteoblasts, which are the great factors in the production of bone, are not found in the pulp; but the dentogenetic cells, with which the tissue is freely supplied, do similar work. When the pulp is nearly exposed, for instance, they combine to repair the damage done by caries. Examples of "dentin of repair" are often seen. In traumatism, too, the process is exactly the same as when a tissue has been wounded, and has been kept in an aseptic condition, and properly protected from certain infective processes. In these cases the method of repair is known as "healing by second intention," or granulation. A third, but exceedingly rare class of cases, where a tooth, having been fractured, and parts kept at rest until union has been effected, supplies an example of "healing by third intention." Cemental or dentinal union is only possible, it is obvious, when pulp or periodontal membrane, or both, have received an injury which has not destroyed their reparative powers, but which has induced a slight or sub-acute form of inflammation, and this stimulated the active cells to perform their functions."

In his second edition[9] he reprints several microphotographs from the collection of Mr. D. E. Caush, and makes extensive quotations, some of which are previously quoted in this thesis.

Dr. Hopwell-Smith again reprints one of the cuts from Mr. Caush's collection in the Journal of Dental Research[10] of March, 1920. While this photograph as shown, has a calcified tissue filling the pulp canal, the case seems to have been again reproduced in connection with a study of hyperplastic cementum, as no mention is made in this article about the osteoid tissue in the pulp canal.

Dr. M. H. Fletcher,[11] of Cincinnati, Ohio, in an article read before the Ohio State Dental Society in 1910, reports a case which gives additional light on the subject. This report deals with the repair of cementum in connection with the treatment of alveolitis and attributes the building of this osteoid tissue within the canal to the activity of the cementoblast of the pericemental tissue, when in reality it would seem that the new tissue was constructed by newly formed osteoblast within the tissue of a traumatized pulp. He says: "A year or more ago, a young lady of nineteen presented herself for treatment. Some years previous she had lost the crown of the first lower molar on the right, by an attempted tooth extraction.

"The crown had been broken at an angle quite below the neck, so that the soft tissues, when they began to repair, lapped part way over the broken surface. On close examination, the soft tissues were found to be quite adherent to the broken surface of the dentin. This being very unusual the roots were carefully extracted, the lump of soft tissues still adhering to the broken surface. The anterior root was decalcified with some of the soft tissue still adherent.

"Sections were made from the root and adherent tissue, and are here presented for your inspection." (On pages 602 and 603 is shown the sections of the case.)

Dr. Fletcher continues: "It was found that the cementum had not only grown over and become adherent to the broken surface of the dentin, but had partly filled the canal of one root from the top down, something after the manner of the growth of secondary dentin induced by abrasion from mastication." (Here he shows four cuts of his case.) Dr. Fletcher attributes this to the activity of the cementoblasts or osteoblasts of the peridental membrane, not attributing it to the result of the action of pulp cells. From the cuts shown and the history of the case, it would seem that this must have been constructed in part from cells of each of the approximating tissues, i. e., peridental membrane and the traumatized pulp.

From the article of Dr. Carl J. Groves[7] it would seem that we are to expect no attempt at repair in the cementum in the apical and peri-apical region with infected cases, or those cases where these tissues have been injured by destructive medication.

In an article by Dr. Grove[12] entitled "A consideration of pathogenic and non-pathogenic pulpless teeth," read before the Northwestern District Iowa Dental Society, December 4, 1919, to which the writer had the pleasure of listening, he called attention to a condition found following a canal filling which is of interest in this connection. His *Figure 9* shows the condition very clearly.

The finding of secondary cementum in this region should not be unexpected as we have osteoblasts present here at all times as long as the apical tissues are vital. He says: "There is one thing of interest in this section which I wish to call your attention to, 'cementum has formed on the inside of the foramen at (d).' This is undoubtedly the result of nature's attempt to close the foramen. I have in the past suggested that this tissue be preserved in pulp devitalization. I first presented these views at the Minnesota State Dental Society in 1915; and since that time at various state societies and many other dental organizations."

Other articles of more or less interest in this connection are given in the bibliography appended, under references [13], [14], [15], and [16]. These articles include much clinical experience and many opinions more or less germane and worthy of consideration.

While some seem to have thoroughly investigated osteoid tissue found within pulp canals, none seem to have investigated the cases under consideration, *i. e.*, those in which there are changes in the stump of a pulp following pulpotomy and a partially filled pulp canal.

It was determined to make serial sections of as many such cases as could be secured. Only those showing a healthy condition in the periapical region were sectioned. These were radiographed, extracted and prepared for microscopical examination.

In selecting the cases no attention was paid to the extent of the canal filling, excepting all where there seemed to have been success in pulp canal surgery and treatment. In each instance as complete a history as possible was secured from the patient, the dentist, and his records. Some histories are most complete, others are fragmentary and uncertain. The points of interest were: Condition of pulp on first visit to dentist. Was the pulp vital, normal or diseased? If hyperaemic, active or passive? Method of pulp removal. Medication particularly as to the use of arsenic and other devitalizing agents or escharotics. Material with which the pulp canals had been filled, or if no canal filling was present, what was the content of the pulp chamber under the filling? Date of last dentistry on the tooth. Date of radiographing and extraction was recorded.

This evidence was filed and given a number in the order in which the case came under investigation. It was taken for granted that all exposed pulps were more or less infected

After a little experimentation with various methods of preparation, the following was adopted as previous methods of grinding resulted in much thicker sections than was desired. The modification here given makes possible very thin ground sections, which is of advantage.

LABORATORY TECHNIC

First, fix in Zenker's fluid, 12 to 24 hours, immediately following extraction.

Zenker's Formula

Potassium Bichromate	2.5 grams
Sodium Sulphate	1.0 grams
Corrosive Sublimate	5.0 grams
Glacial Acetic Acid	5.0 grams
Water	100.0 grams

Second, wash in running water 12 to 24 hours.

Third, Alcohol: 50%—6 to 12 hours; 70%—6 to 12 hours; Absolute—6 to ? hours.

Fourth, xylol at least 24 hours and allow to remain for future use.

Fifth, melted paraffin—48c............one to four hours.

Sixth, water till sectioned.

Seventh, saw in thin sections and wash in water.

Eighth, grind to thickness desired and wash. This grinding was done by placing the thinly cut section between the surfaces of two fine Arkansas stones, each about 2 x 7 inches. With the section between these stones, they are moved back and forth much after the older method of polishing marble. The section is frequently removed and examined under the microscope until the desired thinness is secured. When the section is approaching extreme thinness, care must be taken as it is possible to grind to such a degree that the section disappears.

Ninth, place in absolute alcohol..........one minute.

Tenth, xylol—30 minutes to remove paraffin.

Eleventh, alcohol two minutes to remove xylol.

Twelfth, wash in water five minutes stirring with spatula.

This will clear all spaces and parts of the canals which have been filled with putrescent matter.

Thirteenth, remove, section and treat with a blast of air from chip blower, or compressed air. This will remove all unattached particles.

Fourteenth, place section on slide and watch under the microscope while it drys in the air. This will generally take but a minute. If there is any connective tissue, it will shrink and will be seen to draw away from one side leaving a space, or it may split.

Fifteenth, dehydrate in alcohol for five minutes.

Sixteenth, stain in eosin. (1% aqueous solution, two minutes.)

Seventeenth, wash in water to free of stain granules.

Eighteenth, alcohol to remove surface stain, ten seconds.

Nineteenth, place in carbo-xylol at least five minutes or longer until mounted.

A few case histories, with microphotographs of cross-sections of roots follow. These are shown in various magnifications, that structures may be studied in detail. A consideration of that which has actually taken place under known conditions will go far toward the solution of the problem.

Lincoln, Nebraska, May 1921

(*To be Continued*)

To Summary Readers

This number of our magazine is issued under almost insuperable difficulties due to the nation-wide strike of union printers, determined to impose their will upon free men in a free country. Handled by men unaccustomed to the work, they have done very well under very trying conditions, and to them our thanks are due. They are making your fight and ours for the right of free men to conduct their own affairs in their own way, without interference from groups of men who seem willing to destroy a great industry rather than bear their share of the difficulties of financial adjustment through which we are passing.

The delay has been unavoidable, but shall not accur again if human effort can prevent it.—G. E. H.

PARTIAL DENTURE ATTACHMENTS*

BY A. ALFRED NELSON, D.D.S., DETROIT, MICH.

THE subject of this article appears to be one which, on the face of it, would be easy of description, but this is not the case, for the reason that there is not and has not been placed on the market a single patented attachment, with the possible exception of one which is still in the experimental stage, that functions as a partial denture attachment should.

Contrary to what their sponsers may claim for them, the attachments on the market today are removable-bridge appliances, and as such function well; but as partial denture appliances they fail.

Why this assertion? The mechanics involved in partial denture construction are not taken into consideration, or if they are, are lost sight of in the actual construction of the attachments.

Too many attachments, only half completed, have been placed on the market to meet a certain need and have had to be changed from time to time, yet still lack the principle of functioning as stress-breakers.

In considering the subject, please bear in mind what a partial denture attachment is supposed to do. The attachment itself, upon the abutment tooth, is merely to act as a retaining device and must not bear the burden of stress which is to be placed upon the denture itself. In this lies the secret of correct attachments.

An indictment against the average patented attachment is that it requires the mutilation of sound tooth structure for its placement. The science of dentistry as you and I understand it, is for the conservation of tooth structure as well as the health of the individual. How can we, as members of this profession, really be scientific men and live up to the tenets of our science when, instead of conserving tooth structure, as well as the health of the individual, we mutilate the tooth for the placement of an attachment, and then construct an appliance which is supposed to function upon an entirely different premise or principle than that of the attachments? This intermingling of principles causes the death of the abutment tooth, with its trail of misery and ultimate loss.

To advance in this science we *must* use what crude methods we have, regardless of their imperfections, and improve upon them. That course will retain the principle embodied in the attachment that is a parallel with the principle upon which the appliance is constructed, and which it must embody in order to function. These methods we must use until such time as the thinking men of our profession design other means less cumbersome embracing these principles.

Too many men construct what they term a "partial denture" and use a removable bridge attachment, because they expect to get compensation between the abutment tooth and the mucosa, when it is a physical impossibility so to do, by forcing the abutment tooth to bear a portion of the stress of mastication. No method or means of construction has or for that matter can be made (that is, with our present knowledge of anatomy, physics and physiology), which will allow for a division of the stress of mastication, so that the mucosa will bear its portion and the abutment tooth or teeth their portion of the stress of mastication. It has been attempted, and for that matter is being attempted every day by thousands of men, because they do not comprehend what constitutes *removable bridgework* and what constitutes *partial denture* work. As a result of this injudicious, hetrogeneous application of principles to the construction of an appliance, naught but failure is realized or should be expected.

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*The fourth of a series of articles on Partial Denture Construction, being written exclusively for THE DENTAL SUMMARY.

The inequality of stress upon an unyielding portion and upon a yielding, changeable portion, can never be stabilized with our present patented attachments.

There are a number of "stress-breakers," for that is what we must have between the abutment tooth and the mucosa, that will allow the appliance to be retained, but do not allow stress of mastication to fall upon the abutment tooth. These are very good, though they may be objectionable in certain respects. The retaining device is the clasp, and the connecting link between the abutment and the denture is the stress-breaker, or what constitutes, in removable bridgework, the attachment. These devices do function and function correctly. They are the Custer Insulation, Giffen Butterfly, Campbell Grasshopper, Weinstein's Semi-eliptical, Dresch Stress-breaker, (patented), and the Germann Spring.

The following definitions are axioms which should be borne in mind when planning a case, and if the meaning of the definitions are adhered to in the construction of appliances, better results will be obtained in either branch of our science:

Any structure which through necessity *depends upon the mucous tissues and their underlying bony structure for support*, is a partial denture and not a bridge, regardless of the material of which it is constructed. It must be so designed that it can be removed at will by the patient.

Any structure which *depends upon the abutment teeth* to bear the major burden of stress of mastication, and so constructed that it can be removed at will, is a removable bridge.

213 Chalmers Bldg., Parsons at Woodward Ave.

WHAT ABOUT THE COMMERCIAL LABORATORY?*

BY MR. GEO. L. ROTH, MEMPHIS, TENN.
A LABORATORY MAN

THE MOST SERIOUS PROBLEM confronting the dental profession today is the problem indicated by the growth of the commercial laboratory. All the requisite conditions have existed for the creation of a new and a distinct but correlated vocation, yet these conditions have been almost wholly ignored. Men ought to have been educated for this vocation long ago, but the work which they should have been trained to do has been left to the commercial laboratory, and the task of instructing them to the laboratory proprietor. Notwithstanding the fact that nine-tenths of the dentists of the United States are occasional, if not habitual, laboratory patrons, the question of technical education is regarded with the utmost indifference, as if it either did not exist, or was to be settled, somehow or other, by Divine Providence.

Sometimes the matter is discussed in a superficial manner. Only last year, Dr. Victor H. Sears, of Salt Lake City, delivered an address to the National Dental Association upon the subject. This address was printed in the January issue of the *Journal,* and it is quite typical. *It failed to show the faintest perception of the far-reaching issue that is really involved.*

The very title of Dr. Sears' address is significant. His theme was, "The Need and the Means of Educating Laboratory Assistants." Now, if dentists were quite clear as to the reason for the "need," as well as to the "means" of training the persons in question, the terms used also would clearly indicate the nature of the work for which they were to be trained. There would be some definite appellation for the "persons" themselves that would at least give a hint as to their part in the scheme of dental practice. Yet, for sheer futile ineptitude, could anything be worse than "laboratory man," unless it be the term "laboratory assistant?" All they tell us is that the "person" is employed in a dental laboratory. They convey nothing as to the character of the work for which the man is to be trained, the way in which it is to be distinguished from the specific task of the dental surgeon, nor as to the scope of the knowledge that must be imparted to him, if he is to be efficient. "Mechanical dentist" and "dental mechanic" are better. They are falling into disuse, but they have the merit of being more definite. They do attempt to describe what a man does instead of vaguely denoting the place in which he does it.

The real objection to these terms, however, is not so much that they are silly, but that they are so inadequate as to be actually misleading. They befog the educational issue. They help to hide the one big fact so obstinately ignored by Dr. Sears and the rest of the dental profession, the fact that it is not a matter of obtaining competent but menial assistants, but of recognizing the reality of a definite vocation. They leave the impression that nothing more is needed then a course of manual training, when an education, a technical education in the broadest sense of the word, is absolutely imperative. The laboratory work involved in modern denture construction has gone far beyond the stage in which manual skill is all that is required. Unless the dentist is to waste his time in minute supervision—in which case he might just as well do the work himself—he must employ assistants who can understand his instructions and intelligently carry them out. For a mere "dental mechanic," a mere "laboratory assistant," totally ignorant of the first principles of dental science, this is impossible.

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*Read before the Memphis Dental Society March 17, 192 .

By "artificial denture," of course, is understood not merely a "full" denture, but a partial plate, or a bridge, fixed or removable, and the man who is capable of doing the laboratory work involved in these must also be qualified for that involved in constructing any sort of appliance required by the dental surgeon, not to mention the bench task for any dental restoration, a crown, porcelain or gold, or an inlay. To do this work thoroughly, let me repeat, mere manual skill, though essential, is not enough. Mere manual training, though indispensable, is insufficient. Education is needed, education in dental anatomy, in physiology, in dental pathology, in chemistry, in metallurgy, and in physics, as well as some elementary instruction in mechanical engineering. Finally, the practical training in technic must certainly include a course, and a thorough course, too, in impression taking.

The statement that both education and training are necessary for this work is one that should not require proof. The burden of proof lies upon the objector. If the employment of uneducated, untrained laboratory assistants had made American dentistry a success, a boon and a blessing to the majority of American patients, the case would be different. Then it would fall to the man who advocated technical education in addition to manipulative training to demonstrate that he was not pleading for Utopia. Far otherwise is the true state of affairs. When we compare the pretenses of the average dentist with his actual accomplishments, the conclusion is forced upon us that so far modern dentistry is not merely an *abject failure* but an *abominable disgrace.*

We must not overlook the magnificent strides made by American dental science, thanks to the efforts of those men who are the glory of your profession, the creators, the masters, and the teachers of modern prosthetic technic. We must not forget the fascinating possibilities opened by them for us all, nor that the whole civilized world send us their students to complete their dental education, thanks again to the work of the leaders of American dentistry. We must not overlook these facts; they throw such a lurid light upon the sort of dental service actually available to the average American patient! If these inventions and discoveries show what *can* be done *for* the patient, what shall we say about what generally is done *to* the patient?

Every day of the year over two thousand gold crowns are cemented upon teeth, crowns that have been made in the commercial laboratory, fitted to plaster models poured into shameful impressions, no attention whatsoever being paid to adaptation, anatomical form, occlusion or contacts. Every day a similar number of patients have their mouths butchered for the reception of bridges that violate every rule for correct bridge construction. Every day a thousand or more partial plates are inserted, serving hardly any other purpose but to hasten the end of the patients' natural dentures. The removal bridge has become a mania, only to assure a huge daily output of cast-clasp and attachment monstrosities that mean certain destruction for the teeth used for their support. This is modern dentistry! The dreamland profession about which they perpetually babble at dental society meetings has yet to be born. This is the sort of dental service the public gets in the actual world.

It would be the basest sort of injustice to suppose that the average dental graduate deliberately chooses this sort of practice, or that he even drifts into it with positive indifference. He is the helpless victim of the existing educational system. The educational authorities of the dental profession are primarily responsible. They could have done one of two things. They could have so educated the dental student that, as a graduate, he would not have required the services of the commercial laboratory, or, they could have been frank and honestly acknowledged the impracticability of this course, and have provided for the education of a class of men to cooperate intelligently with the dentist. They have done neither of these things. They have not even betrayed the slightest consciousness that such a dilemma confronted them.

Resourceful dental students, who are really determined to acquire a practical knowledge of prosthetic technic, are generally wise enough to make friends with an experienced laboratory man. They are fully aware that they can learn more from him in a few hours of their spare time than they can from their own professors and demonstrators in the entire four years at college. The vast majority of dental graduates are driven inexorably by their own incapacity, not merely to patronize the dental laboratory, but to accept helplessly the best or the worst that the laboratory has to give them.

If laboratory men had been educated, if they had been instructed in the fundamentals of dental science, as well as thoroughly trained in a sound technic, the present disgraceful situation might have been prevented. Such a class of men would have formed admirable material for technical demonstrators in college laboratories, instead of the seniors or inexperienced graduates who do their honest but hopelessly inefficient best, as things are. Such a class of men, earning their livelihood by serving the dental profession in every city of the country, either in dentists' offices, or in establishments of their own, would feel the responsibilities of a recognized and respected vocation. They would render invaluable aid to the dentist who really wanted to render decent dental service to his patients. Business sagacity, business competition, and pride in their calling and their reputation would cause these men to employ none but the best materials, none but the most accurate procedure, besides making them insist upon good preparatory operations for their mechanical work. The superior quality of their work would free the dentist from anxiety, save his time, permit him to concentrate upon the development of his own surgical technic, give him self-confidence, enable him to carry conviction to his patients, and last of all, preclude the necessity of that equivocal position into which he is generally forced by his dependence upon inefficient laboratory service.

The laboratory man is not to be blamed for his own ignorance and inefficiency. The laboratory proprietor has been compelled to develop his technic and his organization without any guidance, without encouragement, and without recognition by the leaders of the dental profession. That technic has been developed under the pressure of two conditions, the inefficiency of his patrons, and the poor character of the labor he has to employ.

The average laboratory patron is always in a frantic hurry. He will not take the time necessary for the preparatory work for correct denture construction. He will not allow sufficient time for correct laboratory procedure. He could not adjust a properly-made appliance even if he received one. He cannot afford to pay for good prosthetic work, because the haunting fear that his patients will discover the real extent of his incapacity compels him to charge a mere tip instead of collecting a fee. If the laboratory patron had the support and the guidance of an educated class of technicians, instead of the existing uneducated class of laboratory men, he might learn to control his patients instead of letting them drive him. He has no such support. His helplessness reacts, in turn, upon the uneducated laboratory man. The latter, his vocation not even being recognized as a legitimate factor in dental practice, is unable to resist the pressure of professional incompetence and its effect upon his own procedure.

The second condition has been even more disastrous still in its effect upon the development of the technic of the commercial laboratory. The dental profession, on the whole, treats the laboratory man's calling as a scullery mechanic's job. Therefore the laboratory proprietor is compelled to adapt his technic to the mentality of the type of man, who, generally speaking, is willing to accept the ignoble position forced upon him by the asinine stupidity of the dental educational authorities, and the beef-witted inertia of the average dentist.

If it were not for the scarcity of skilled labor, even of the class usually available, the laboratory proprietors of this country would be in a position to do something for the cause of technical education.

Skilled labor, however, is exceedingly scarce in the laboratory business. In spite of the fact that they are so dependent upon them that if some weird and supernatural catastrophe were to strike down every laboratory man in the country today, tomorrow two-thirds of the dental profession would be utterly helpless, dentists have not had sense enough to grasp the elementary fact that if you need skilled service, you must train men to perform that service. If it were not for that scarcity of labor, if every laboratory proprietor could command an efficient and an ample organization, a very different state of affairs would be apparent. He would have time to train himself, to train and educate his assistants, apprentices, junior laboratory men of the better sort, not to mention dental students, or even dentists' office assistants, in the more rudimentary phases of prosthetic technic.

There is hardly a phase of dental education or dental practice that is unaffected by this problem. It can be shown thrusting itself even into professional ethics, and into what is termed dental economics. There is one phase of dental education, however, a phase which ought to be a source of great hope, but which, nevertheless, is seriously impeded by the commercial laboratory and its dependents. This is the field of Post-Graduate Work. Year after year the leaders of dentistry give clinics from one end of the country to the other. They lecture, they demonstrate, they argue and they plead in their endeavors to make dentists practice dentistry. Their work is splendid. Without them, conditions, bad though they are, would be too appalling to contemplate. Yet their efforts are largely frustrated, and the chief obstacle is to be found in the underlying causes of the evil we are discussing. The extent to which the average dentist, in fact, the vast majority of dentists can profit from these clinics is limited because they are dependents of the commercial laboratory. Even when he "does his own work," the dentist is generally very inexpert in his bench technic. He generally makes a botch of the procedure demonstrated by the clinician. On the other hand, while a few laboratory men are greatly aided by these clinics, they cannot, as a rule, derive much benefit from them because of their lack of education in the fundamentals of dental science. As long as the education of the laboratory man is neglected, post-graduate work will remain, two-thirds of it wasted effort.

There is something almost bewildering about the psychology of the dental profession. The case for vocational recognition for the education of dental technicians is so self-evident that it is inconceivable to me how any reasonable man could maintain the contrary. That it actually should be ignored is absolutely incomprehensible. Yet such is the case. This issue has never even been discussed. Dr. Sears, for example, treats the whole problem as one of training, manual training, which he miscalls education, of mere assistants. Not once does he give an inkling of the fact that we have really to deal with an educated as well as a skilled vocation. Not once does it occur to him that the part to be played by the "laboratory assistant" cannot be that of a servant, that it must be the part of a collaborator, and that the very term "laboratory assistant" is idiotic.

Furthermore, his blindness to the cause of the trouble is as great as his blindness to its nature. After dwelling upon the schools for mechanical dentistry, and dismissing them, as they deserve to be dismissed, he expatiates upon "exhibition models," upon text-books, and selected articles from the journals as means of imparting instruction to dental mechanics. Finally he comes back to the dental college as the only fitting place for the educational purpose in view. The dental college! The great business-builder for the commercial laboratories! If the present college faculties are incapable of providing sufficient instruction in prosthetic technic to the dental student to prevent him from becoming a dependent of the cheapest commercial laboratories, how in the name of common sense can they ever hope to train dental technicians?

Now comes the climax: Dr. Sears sounds a warning. He senses grave dangers. Of course, he and everybody else knows that modern dental practice is a positive menace to the general public, and it might be supposed that he had this in view. Not at all! Dr. Sears' menace is a different menace. Dr. Sears' menace is for the dentist, not the patient!

"What!" it will be exclaimed, "Does the dental profession face a danger more grave than that which confronts the innocent patient who sits so confidingly in the chair of the average dentist? For God's sake, let us have the whole truth about dentistry at once."

Let me quote Dr. Sears' own sinister words: "And here (let us make no mistake about it), the profession faces a danger, if not an actual menace. If the colleges continue to neglect this important phase, we may be sure that the supply houses and the commercial laboratories will seize their opportunity and take the upper hand. They will undertake to *control* this branch of the profession and teach what the college should teach, just as they have undertaken to teach us in financial matters."

Adequate comment upon this is impossible. The English language has its limitations. Yet it would be superfluous.

There is one perfect gem of thought in this address which speaks volumes in itself: "Incidentally," Dr. Sears tells us, "it does not seem to have occurred to the dental colleges that the conducting of courses for dental mechanics would open up a new and very desirable field for prospective dental students."

This is almost incredible! Yet Dr. Sears is not a fool. No man could be as prominent as he in the counsels of the profession if he were totally devoid of ordinary sense. Nor was he talking to fools. They all know the dental student. They all know the college faculty. They all know the dental graduate, and they all know the laboratory business. There is but one conclusion to be drawn, and that conclusion is the sole justification for taking up your time with Dr. Sears' address. At present, the National Dental Association, rather than sanction any exposure of the real proportions of professional incapacity, will only tolerate an address upon this subject that consists of twaddle, so inane that it would embarrass a lunatic asylum, and make a crowd of chattering imbeciles blush with shame for the human race.

My immediate purpose, tonight, is to arouse interest in this problem, not to prescribe a solution. That it must be solved before very long is imperative. Some of us have conceived how this may be done. Before very much can be done in the way of devising plans, however, for the education of those who are to do the laboratory work of denture construction, the necessity of that education must be firmly grasped by the effective members of the dental profession.

I have spoken harshly, but let me assure you that every word has been weighed carefully. There is nothing that anyone of you can say is substantially false. I appreciate the honor of being permitted to speak to you as I have done tonight. Your attention is a signal proof of the American spirit of fairness. I believe, and I know that you will agree with me, that the dental profession of the United States must be convicted of gross negligence in regard to the evil we are discussing. I believe, and I know that you will agree with me, that if something is not done soon, then the dental profession, and that means you yourselves, must be charged and convicted again of a serious dereliction of duty.

I am sure that no step must be taken without the cooperation of the more prominent men in the laboratory business, men like Boos, of Minneapolis, Supplee, of New York, and last but not least, one, who though not a commercial laboratory man, may be justly termed the founder of the craft of the dental technician, Louis J. Weinstein.

If you do not wake up to reality, if you persist in ignoring these conditions, or, if you attempt to solve the problem yourselves, in a purblind spirit of Mandarinism, without taking the leaders of the laboratory world into your counsels, then you may rest assured that these men, in conjunction with the more wide-awake dentists of this country, will certainly undertake the task without your cooperation. Even that would be better than the present state of affairs, but it would lead to a factional strife in our common calling, which might prevent dentistry coming into its own as quickly or as completely as dentistry must.

In conclusion, let me suggest a proper name for our embryonic calling. What is the objection to "dental technician," instead of "laboratory man," or "dental mechanic?" There is a good etymological justification for the term. The Greek word "technon" furnishes us with the root. It is an ancient word, and the sense in which it is used in the Iliad and the Odyssey is significant. In the Homeric age, it had the same meaning as the old English "wright" surviving in "wheelwright." A "technon" was one who "wrought," who wrought in gold, or silver, in copper, bronze, or iron, in ivory, in wood, and even in leather. He was a combination of goldsmith, silversmith, ironsmith, armorer, cabinet-maker, and he also understood the mysteries of tanning, inlaying upon metals, enamelling and so on. He must have been a very clever man. He was no menial, nor was he a slave. It might be mentioned that the "dental mechanic" of the European continent, too, is called a "techniker." In the commercial laboratories of the medical profession, the workers are called technicians. Surely one who fashions gold, platinum, porcelain and vulcanite into a denture, who must be a craftsman, an artist as well as a mere mechanic, if he loves his work, must be more nearly like the "technon" of Homer, than a man who merely identifies bacteria, or isolates serums.

Guaranty Bank and Trust Co. Bldg.

THE DENTAL HYGIENIST*

BY FRED D. MILLER, D.D.S., ALTOONA, PA.

IN 1911 I had the good fortune to hear Dr. Alfred C. Fones, of Bridgeport, discuss a paper at a meeting of the Connecticut Dental Society in Hartford. This was my first introduction to the Dental Hygienist. The following year I graduated and during the summer I visited Dr. Fones' offices in Bridgeport. Since that time I have been an enthusiastic supporter of this idea as fostered by him.

(I hope you will pardon this personal allusion), practically all of my time during the first year of practice with my father was devoted to cleaning teeth. And I would like to say that it was a most profitable year for me (in experience only), in that I learned a lot about how little I really did know. However, the following year my Dad retired from active practice and because of the training I received during that first year of practice in cleaning teeth I learned to have the highest regard for a perfectly clean mouth. At first I had a lot of my patients come at regular intervals for these prophylactic treatments, and soon I found that half of my time was devoted to this work. It was always the first thing I would do before starting any other work in the mouth, except the relief of an acute condition. During last eight years, I have never once regretted the many hours that I spent in "*cleaning* teeth". I still spend considerable time cleaning teeth myself and we have our patients come at regular intervals.

This long prelude may not be interesting. However, I want you men and ladies to know that with me the dental hygienist idea is not a "flash in the pan". I have given it serious consideration for eight years, and have had one in my employ for two years. *You and I know* the value of a clean mouth. *We know* the time it takes to clean teeth properly. *We know* how much patients appreciate it. *We know* how much and how little injury can be produced to the gingiva with scalers. *We know* that periodic prophylactic treatment will reduce the incidence to caries. *We know* that the average dentist does not clean teeth properly, and a dentist who does not himself clean teeth properly is not capable of judging the ability of a dental hygienist to clean teeth. *We know* that it takes a great amount of educational talk to get adult patients vitally interested in their own mouths, a little less to get them interested in their children's mouths, and a lot more to get them interested in other children's mouths. *We know* that children form good habits easily and early; however, repeated instruction is necessary. *We know* from the census that there are twenty-five million school children in the United States who need instruction in the home care of the mouth.

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*Ohio State Dental Society, Dec., 1920.

We know that the forty-five thousand dentists in the United States, even if they all had a change of heart and "*other change*," are not capable of doing the necessary reparative and restorative work which demands attention if we are to eliminate the mouth as a serious source of systemic disease. *We know* that unaided they cannot do all of this necessary educational work. Everything Dr. Friesell said yesterday is an argument for the Dental Hygienist.

We know that Mayo said, "the next great step in preventive medicine should be taken by the dentists. The question is, will they do it?"

We know that Osler said, "there is no other one thing in the entire field of preventive medicine that equals mouth hygiene." But—do you know *these facts?*

Do you know that dental hygienists with one year's preparation in a training school specializing on one phase of dentistry, cleaning the exposed surfaces of the teeth, and directly under the free margin of the gum, are far more skillful, thorough, conscientious, painstaking and competent than the average dental graduate?

Do you know that the dental hygienist makes possible the regular cleansing of the teeth of our patients in private practice and the proper education and instruction of our patients in the home care of the mouth by means of a follow-up system? And this is an important part of our duty to our patients—a regular periodic prophylaxis.

Do you know that the dental hygienist has been endorsed by the United States Government at Washington, D. C., and that civil service examinations have been instituted for them?

Do you know that they are employed by the Surgeon General of the United States?

Do you know that twelve states in the United States have already legalized the Dental Hygienist, these states including Connecticut, Massachusetts, Colorado, New York, California, Iowa, Michigan, Minnesota, Maine, New Hampshire, Oklahoma, and Tennessee—the largest centers of population?

Do you know that Pennsylvania has a bill in the process of construction to be presented to our next session of legislature? The bill contains a feature that will probably do away largely with the opposition to the Dental Hygienist movement, in that it requires that a dental hygienist *must* spend eight months in a public or charitable institution before she is permitted to practice in the office of a private practitioner.

Do you know that the *Oral Hygiene* Magazine for January, 1920 published fifteen short papers on the Dental Hygienist, and that of the fifteen, H. L. Wheeler, N. S. Hoff, G. F. Burke, H. J. Burkhardt, A. A. Stevenson, C. N. Johnson, Thaddeus P. Hyatt (a man with a vision who has labored for twenty years in New York State for Oral Hygiene and has been jeered at and hissed, but had the courage of his convictions and is now receiving the respect and consideration he so greatly deserves), J. Wright Beach, Elizabeth Hardy, Agnes E. Christie and Alphonso Irwin were all strong for the dental hygienist and only three, Doctors Barrett, Hynes and Friesell were against it, with your own Dr. Ebersole being neutral?

If you are "*on the fence*" know the truth by reading these articles in January issue of *Oral Hygiene*.

Do you know that the results obtained after five years' mouth hygiene in the public schools at Bridgeport, where the figures show a reduction of 33 — per cent in caries, show that Bridgeport had less deaths per thousand during the influenza epidemic than any other city approaching it's size in the United States? That the city authorities of Bridgeport have appropriated $43,500 to be used in oral hygiene work for 1920? Do you know that in 1912, 42 per cent of the entire school budget was spent for re-education, and that in 1918, after four years of mouth hygiene, only 17 per cent of the budget was spent for re-education—a reduction of 50 per cent? Have you read that complete report? If not, do so immediately.

Do you know that the Pennsylvania State Department of Health has employed a dentist, Supervisor of Mouth Health, and is giving a demonstration in all the cities of the Commonwealth, using two dental hygienists with portable equipment, and that this supervisor is giving almost daily talks to School Boards, Rotary and Kiwanis Clubs, Chambers of Commerce, etc.?

Do you know that there is only one argument that has ever been advanced against the legalization of properly-trained dental hygienists although the issue has been be-fogged in a cloud of oratorical rhapsody by Barrett and a few others? As Kirk says in an editorial in December, 1919 *Cosmos*, "The question then is not on the licensing of manicurists, typewriters, office assistants, and all such people, *et id genus omne*, as dental hygienists, but of persons properly trained and equipped for the service intended."

THE DENTAL HYGIENIST*

BY ROSE COXEN, D.D.S., UTICA, N. Y.

A FEW months ago I was invited to discuss a paper on "Oral Hygiene" and not having seen the paper prior to the discussion, it was necessary that my remarks be of a somewhat impromptu nature. Being convinced that my essayist was very much in favor of the dental nurse, I remember asking him if he intended making any reference to her and he said: "Yes, I think I will in a general way." I then told him that I feared my remarks would be quite derogatory to his if he did, at which he replied, "Go ahead, Doctor; I like a scrap." Now the gentleman in question happens to be a man for whom I have a great deal of admiration and respect, and yet, even with the convincing attitude that he assumed in relation to this subject, I felt that I could not agree with him, so that when it came time for me to discuss the question, I said that I wanted to preface my remarks with the words of Lincoln, viz.:—"With malice towards none and charity for all." And so in writing this paper may I be permitted to make use of this same introduction?

I am heart and soul in favor of anything that is going to promote the health in any community. When it was seen fit to countenance the legalizing of the dental hygienist she was supposed to be placed in our public schools and charitable institutions with a view to carrying the doctrine of clean teeth to their pupils and inmates, but instead of this, I am told that to-day, the majority of them are occupying places in private offices. I also understand that seventy-five per cent of the dental profession is against the legalization of the dental nurse, but the keynote of professionalism has not been sufficiently sounded in their ears to enable them to come forth and give utterance to their objections. Professionalism should be the dominant note on the keyboard of dentistry to-day. This is the ism that should be knocking that other ism, namely, commercialism, sky high; but instead, we introduce an adjunct that is going to foster this latter ism, rather than destroy it; and why, in the name of all that is great and good, the men who have labored so long and faithfully to bring dentistry where it now is, should not have been able to foresee this, is more than I can understand.

Dr. Hunter, of London, has made the statement that we dentists are responsible for more deaths than the medical profession ever thought of, being by reason of the fact that we have allowed to remain in the mouths of our patients teeth with non-vital pulps in them, over whose apices granulomata have been formed. This terrible accusation naturally set us all to thinking, and I believe it was Dr. Johnson, of Chicago, who thought so hard, that at the National meeting in Louisville, he said that while, to some extent, Dr. Hunter might be justified in making such a statement, he, for one, felt that the dental profession had always done a great deal to alleviate suffering humanity, and that many wonderful deeds had been performed at its hands. I thoroughly agree with Dr. Johnson. And, when I see dentistry at the point where it can just as well take second place to none in the field of science to-day; when, instead of its being the arm of the medical profession, the reverse might just as well be the case; when, just as it is reaching the climax of all this glory and achievement, it is appalling to have to watch it go backwards in the ranks by the placing in the hands of inexperienced, unsophisticated helpers, the most important part of our work; namely, that of periodontia.

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*Ohio State Dental Society, Dec., 1920.

Some of you are going to take exception to this nomenclature in connection with this "dental asset," but any girl who takes up just the one branch of this subject, viz., prophylaxis, if she has any snap and get-up in her at all, will never be content to polish the exposed surfaces of the teeth year after year, with no chance of bettering her position. The top of the ladder ought to look pretty good to her, and what is to hinder her employer from letting her do the whole thing? In the meantime he is busy making a great many simple extractions into real surgical cases. In other words he is becoming a wonderful specialist, and is doing things that he would not have thought of doing years ago, before his conscience was allowed to become loosened from its moorings. Meanwhile his coffers are being replenished with the shining coins that his dental adjunct is bringing in to him. All this time she is going further and further beyond the boundary-line in spite of what may be written to the contrary in our dental journals.

In this connection this little excerpt from the *Cosmos* is most amusing: "From the very first, the student preparing to become a dental hygienist has had impressed upon her that her efforts should be limited to the plus side of the oral health line, and she should not treat the pathological." It still further goes on to say, "I anticipate the question, 'What is to prevent her from yielding to an impulse to investigate pyorrhea pockets, curette roots and otherwise infringe on the rights of the periodontist?' By training her in the use of instruments designed for purposes within her field and educating her to a professional respect for the tissues beyond her province."

That is like putting a bathing suit on a child and telling it to play in the sand, impressing it with the fact that it must, under no consideration, go into the water. I would not blame the child for disobeying any more than I would blame the nurse for going beyond *her* sacred precincts. She can't go on unceasingly being just a machine in the hands of her employer. Her gray matter would become withered; and yet you say, "Thou shalt not." If dentists consider oral phophylaxis "disagreeable drudgery," what must they think of the position of the poor little hygienist, who is supposed to go on day after day cleaning up the exposed surfaces of the teeth? They probably would end by doing just what *I* would do if *I* were similarly placed. I'd go the limit! With what result? I would most likely do what one of our able practitioners saw done in Boston during the time of our National meeting. While reading a paper before the American Academy of Periodontists he stopped in the midst of it to tell us that he had visited the

Forsyth Dental Infirmary that morning, and had been appalled to see the destruction of gum tissue that was taking place at the hands of the dental nurses. If this were being done in a preparatory school, how could it be avoided in a private office, where a man is so busy that he would not have the time to see that his nurse was doing the right thing by his patient and keeping within her limit? I think that the old adage "a little knowledge is a dangerous thing" might be applicable in her case.

It has been stated that over a period of four years there has yet to be reported *one* violation of the law by a dental hygienist. Even though no case has been *reported*, it does not necessarily follow that *no* violation has taken place.

Waiving all possible objections to the question at issue thus far, let us look at the great underlying principle involved, as to why it behooves us as dental practitioners, to learn to like this part of our work, or else, in the event of our being obliged to have someone do it for us, to have in our employ a real, full-fledged operator. I believe that oral hygiene had its incipiency some twenty-four years ago, but did not reach the zenith of its perfection until seven years after that time. Dr. D. D. Smith had been striving to stir up his professional brethren to the necessity of taking care of the soft tissues of the mouth, and it was not long before men were traveling hundreds and hundreds of miles to watch him operate. It was not until some of them saw, with their own eyes, the wonderful work that he had accomplished, that they were willing to listen to his theories with regard to mouth cleanliness, but, when they did, it revolutionized the whole field of dental science, and gave them an opportunity of allowing their patients to be benefited by his experiments. I followed up his teachings to the best of my ability, feeling at times very lame and weak along this line, but firmly convinced that preventive dentistry meant health and happiness to my patients, until finally it became apparent to me that unless oral prophylaxis, or mouth sanitation, had been properly performed, I could not consider that a thorough diagnosis of my patient's mouth had been made.

To illustrate the truth of my statement I just want to refer to a little incident that occurred with regard to my own oral cavity last spring. I was in the hands of a man whom I consider one of the finest operators in the country, and one afternoon he made an examination of my mouth and told me that if I would come to his office the next day he would fill the three cavities he had found. I did so, and when he had finished he gave me an appointment for the following day for an oral prophylaxis treatment. During the process of scaling he suddenly exclaimed, "Doctor, I've found two more cavities. It beats all how one does find extra cavities when one is giving a prophylaxis treatment." I could not help laughing as I said "I would have been surprised if you had *not* found any more." I then told him that it only bore out my statement of two days before, when he had been present at a meeting where I had discussed a paper, in which I said that diagnosis was never complete until the dentist had placed the mouth in a thoroughly sanitary condition. Mind you, I said dentist, *not* hygienist.

This part of the work gives a man an insight into all the possible crevices, pits and depressions that might otherwise be overlooked were it not for the fact that his hand and eye have become so accustomed to working and searching in just such places because of his thorough and painstaking efforts along this line.

A dental hygienist has never been trained to recognize caries. It takes a *real* artist to discover many of them. She does not know the difference between a discoloration and a cavity. I have known her to take an oxy-phosphate of copper filling for a carious tooth. Eggshell enamel she knows nothing about. Her training has been so limited that she can't help it; and yet the great burden of responsibility that is *liable* to be placed at her doors by the man with an elastic conscience, by the advertising man who sees in her a possibility of increasing his revenues; by the man who is relieved of doing this "disagreeable drudgery," and commercializes his work by posing as an exodontist or an apicoectomy specialist, etc., the question of offering professional services at "reduced rates," and last, but by no means least, the student who enters college imbued with the idea that he does not have to bother with "cleaning teeth" because he can get a dental nurse to do it for him, thereby hindering his chances of becoming a proper diagnostician.

These are some of the reasons why the dental hygienist should have no place in private practice; but should confine her work to the rendering of services in the public schools and charitable institutions. I am very certain that one of them could not occupy a position in my office even though she offered her services free.

All of us know that when we take a patient under our care we should study that particular patient and treat him accordingly. One might require a prophylaxis treatment once a month, another might go two months very nicely; then again we will find one who can go three months with perfect safety, and yet I know where dental hygienists call up their patients every month for their prophylaxis treatment, when very often it is absolutely unnecessary but they have not been trained to understand the question of studying each individual patient. Their work is simply mechanical. They make a set of fast rules and expect their patients to abide by them, thereby injuring the tone of the dental profession and taking away its dignity

Not long ago I was talking with a dentist who favors the legalizing of the dental nurse. I told him I could not understand why a medical nurse is obliged to have three years of training before she is allowed to go out and practice nursing, whereas a girl could go to a dental school for a year and then call herself a dental nurse, and this was his reply: "A medical nurse only has one year of *real* training; the rest of her time being spent in scrubbing floors, etc." Not long after I was talking with one of the best men in the medical profession and I asked him if this were really so, and he said, "Whoever told you that grossly misinformed you. It is absolutely *not* so."

It is variously estimated that we have in this country forty-eight thousand dentists to take care of one hundred and ten millions of people: that only fifteen to twenty millions of this number have been sufficiently educated to realize the importance of caring for the teeth, and that this is the real reason why the dental hygienist has been given a place in our profession. This to me is very lame excuse. If these same forty-eight thousand dentists had been made to understand the true importance of oral hygiene they would to-day be spending a good share of their precious time in the practice of preventive dentistry rather than remedial, and would not find it necessary to supply a makeshift to do it for them. If, at our National dental meetings, we could have more real meat along this line, with less data and fewer statistics, the time would come when more men would feel like spending their good money and expending their valuable time in really getting something that they can take home to their patients, enabling them to render better and more efficient service than ever before. What we want at our National meetings is fewer papers, less detail and more of the real practical side of our profession. In other words we don't want the food so rich and we don't want so much of it that we can't digest it. You can't impress your hearers unless you have something with which to impress them, but you *can* make that impression so impressionable that it will leave a permanent impress. That is what we want to see done with the words "preventive dentistry." We want to see them so emplasized at our dental meetings that the time will come when every man in our profession will be so thoroughly convinced of the importance of them that commercialism will be wiped off his slate.

I wish that every dentist in the country would read Dr. C. N. Johnson's article in the August *Cosmos* entitled "Professionalism vs. Commercialism," which he read at a complimentary banquet given in his honor in Kansas City last April. The toastmaster in introducing him, paid him a tribute, which, in my estimation, he justly deserves. No one ever spoke more truly than did Dr. Johnson when he said, "The dollar mark in dentistry was never so prominent as it is to-day." His subject reminds me of what one of my professional brethren said to me at the meeting in Boston last August when he lamentably expressed the belief that commercialism is occupying altogether too high a place in our profession to-day, and I believe, with all my heart, that the legalizing of the dental nurse has more to do with this deplorable fact than any other one thing.

With Hunter's discoveries men have become so enthusiastic over the question of surgery and exodontia that they have no time for preventive treatment, so they now turn it over to a substitute, just because the vision of that almighty dollar is ever before them, with the result that many cavities are overlooked for want of proper and thorough examination on their part.

We owe something to our patients. Their mouths should be examined with as much care as we would wish our own to be. We should not make it necessary for them to come to a hygienist for prophylaxis and then ask them to come again for an examination by *us*, for certainly no conscientious practicioner would depend on his nurse for the correct diagnosis. It would be just like expecting a surgeon to let his nurse examine his patient for him to determine whether he had appendicitis, a tumor, or what not.

I am wondering what the medical profession would say if a man were allowed to go to college for one year and study throat troubles and then go into an office with some physician and take up that particular branch of medicine. This sounds as plausible to me as the legalizing of the dental nurse. You can't give her the crust and not the good, juicy part of the pie, and if she *has* just the crust her days are indeed going to be monotonous ones. She will go through the same humdrum existence day after day, week after week, month after month, and year after year with no chance of bettering herself. Her limit is reached the day she is graduated and she will be forever confronted with the thought that she must not go beyond that "sacred gingiva." What a perfect nonentity she must feel herself to be unless she is one of those careless, irresponsible creatures who care for nothing in the world excepting just to get through it in the easiest possible manner with just enough money at her command to buy a few pretty gowns.

"With the exception of New Hampshire, Massachusetts, Michigan and Colorado, the laws limit this field to women, and there is no evidence in these latter states that the examiners will allow men to qualify." Poor men; think what they are denied! The privilege to remain at a standstill for the rest of their lives! Unjust and unhappy thought, say I! But after all man is responsible for this condition because he is *so* charitable as to think that he must of necessity give women the easy place. So kind of him! He has our warmest thanks! Would that we might give him our blessing. But let us trust that a few years from now he won't need it, because I am hoping that the time may come, when every woman who enters the dental arena will do so with the idea of taking the *whole* course or *none* at all, thereby fitting herself to be a truly useful member rather than a mere tool in the machinery of dentistry.

I have in mind a man who stands for all that is best and most honorable in his life's work. A man who rendered such valuable services during the war by reason of his skill along the line of surgery, that he has earned for himself a prominent place in dentistry to-day. I was talking with him a few months ago and I asked him why he did not employ in his office his sister, who, as I understood, had just been graduated as a hygienist, and he replied: "Why, Doctor, I could not very well take into my office even a sister of mine when I do not approve of the law that allows her to practice prophylaxis." He agreed with me that she would be an aid in assisting the cause of oral hygiene in the schools but had *no* place in private practice.

In closing I just want to say that if we are not fully awake to the signs of the times the word "professionalism" is going to spell "commercialism". This, each and every one of us may avoid by following Lincoln's maxim, viz.: "Keeping forever alive within us that celestial spark known as conscience," and with the ignition of this spark mark the beginning of a fire of enthusiasm that will mean for our patients a better, more thorough, more painstaking and more conscientious dentistry.

LEGISLATION RELATIVE TO DENTAL HYGIENISTS*

BY HOMER C. BROWN, D.D.S., COLUMBUS, OHIO

IN preparing a paper on this subject so that it may co-ordinate with some of the views of the two essayists immediately preceding me in your official program, I am at a distinct disadvantage since I am not familiar with any of the special features which are to be advocated by Doctor Miller. But as I understand it, Doctor Miller is to present arguments in favor of the dental hygienists, and the paper of Doctor Coxen, which I have been permitted to read, opposes the creation of a legal status for this class of limited specialists.

In the first place, I want it distinctly understood that I have no desire or intention to advocate a policy of lowering the present status of the dental profession. If anyone takes such a restricted view as to interpret the legalizing of dental hygienists as reducing this status, they may also require evidence that I have liberally contributed of my time and energy in raising the standards of dentistry as compared to what they were at the time of my entering the profession in 1890. However, I do not think it necessary to attempt to furnish any of this evidence, but certainly do not want to be misunderstood and have anyone assume that I am now endeavoring to destroy that favorable position which has been created only after a long and concerted effort on the part of many. On the other hand, in the present emergency, and I am using this term advisedly, I am willing to take advantage of a situation which has been more or less the result of the progress of dentistry, or at least it is the result of one of the recognitions of the relation of the oral cavity and its organs to general systemic conditions. When we appreciate the fact of the increased demand for dental services today and that the numerical strength of the profession is but slightly in excess of what it was a decade or so ago, then we can better understand the necessity for taking advantage of a limited service such as can be rendered by a class of young women who are sufficiently interested to prepare themselves under such regulations as may be provided by State Legislatures. These young women can render a helpful service in the offices of the private practitioners and this service in no sense will be limited to the prophylactic treatment of the exposed surfaces of the teeth of such persons as may be assigned to them, but to a greatly increased and a more efficient service in the general office duties which are frequently performed by those not sufficiently trained or equipped.

In addition to this there is an important field for this class of limited specialists in the schools and in private, county and state institutions, as well as in industrial clinics; but let it be distinctly understood that the work of these dental hygienists is to be properly supervised. In the first place in any legislation enacted creating a legal status for the dental hygienists, the interests of the public must be adequately protected. Second, the profession's interest must be fully safeguarded, and thirdly, the dental hygienist's opportunities must be such as to stimulate her to renewed effort in order that she may be the better equipped from close application and further study to assume and discharge her full duties and responsibilities. Otherwise, I am opposed to legislation which does not both safeguard and protect all these interests; but I am frank to confess if we do not take a sensible, practical and generous attitude towards this proposition, that this will be promoted by other organizations whose conception of what is best required to solve the problem may be quite different from what the dental profession might aid in providing.

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*Ohio State Dental Society, Dec., 1920.

I was permitted to read Doctor Coxen's very well-written paper, but I have no hesitancy in saying that I cannot agree with her in most of the arguments she presents in opposing the dental hygienist. She states she "is heart and soul in favor of anything that is going to promote the cause of health in any community," and immediately after making this statement she makes a personal appeal for the dental hygienist in favor of not limiting her field of operation and pours out her "soul," as it were, unsolicited so far as I can understand, in behalf of a class whose status in life will undoubtedly be improved rather than the reverse, when they meet the requirements to render this limited service. This proposed new opportunity for helpful service is not one which boldly and without due consideration reduces the position or opportunities of the dental hygienist, but it is one which should stimulate many to aspire to qualify themselves to render a special limited service. In other words, it is an added field of employment with a promising future. Further, there is no barrier or restriction which prohibits a young woman from meeting all the requirements for dental practice or even to do this after she has had a few years of successful practice and experience as a dental hygienist. This procedure is not an unusual thing with the medical nurse.

From some of the arguments used in opposing the dental hygienist, I am of the opinion that an increased percentage of them will sooner or later complete the full dental course, and assuming that they will be the best equipped ones, I have no hesitancy in saying that their entrance into the full professional activities should be decidedly helpful. My conception of the dental hygienist is that she will function with the dental profession in a manner similar to a registered medical nurse with the medical profession, and I am quite sure that no one needs a diagram, statistics, or words of praise from me relative to the efficient, highly commendable and self-sacrificing service rendered at all times by the medical nurse. She has won an enviable position both at home in times of peace and in foreign lands when the war clouds encompassed the entire world. There is one unfortunate condition existing to-day in relation to the medical nurse and that is that each one cannot divide herself into another of equal merit and thereby be better prepared to meet the demand for such special semi-medical service. To-day from the stricken typhoid-fever city, Salem, we hear the renewed appeal for more nurses.

My version of the inception of the dental hygienist does not agree with that of Doctor Coxen when she states that they are legalized in several states primarily for school and institutional work. On the other hand, I think those who first advocated the dental nurse or dental hygienist had in mind the question of supplying the busy practitioner with an efficient office assistant who had shown an interest in this service and was willing to take advantage of whatever special training she could receive in order to render a more efficient service. In this connection our late Doctor C. N. Wright was one of the pioneers in advocating the dental nurse and he presented a paper before this Society on this subject probably 15 years ago.

The statement made by Doctor Coxen that seventy-five per cent of the dental profession are opposed to legalizing the dental hygienists is in my opinion far from an accurate one, but even so this would not in any sense deter my course if I thought the seventy-five per cent were wrong. In fact, I have been engaged in professional activities for some years and those opposing the questions I was promoting usually claimed a percentage in excess of seventy-five per cent. I especially refer to the reorganization of the National Dental Association and affiliated societies, and also to both State and Federal legislation. These statements and that opposition very largely resulted from lack of information and I will go on record at this time and state that in my opinion fifty per cent of the dentists of the country have not given this question sufficient consideration to have formed any intelligent and definite opinion as to whether or not they are in favor of legalizing the dental hygienist. For instance, I am fully convinced that the Ohio profession ranks as high as that in any state and that those in attendance at this session are not the least representative of the Ohio dentists and in further pursuing this line of thought, I am prompted to ask a few questions at this time in order to ascertain the attitude of our members regarding this question, as well as a guide for our Legislative Committee.*

Doctor Coxen seems to think that if the field of the dental hygienist is to be limited to school and institutional work that they can render a very important service, but if they are so wholly incompetent as she and some others would have us believe and be so hampered for opportunity for advancement, why should the school children and the wards in the said institutions be so imposed upon, and why be so inconsiderate of the interests of this somewhat restricted class of young women? She further made a very positive criticism of the general practitioner who has seemingly awakened to the fact that the question of tooth extraction is a more serious operation than it has formerly been considered, while I wish to commend the general practitioner who recognizes the fact that the extraction of a tooth is more of an operation, in most cases, than it was formerly considered, since many of the extractions are impacted teeth and others are such as to require curetting and after treatment in order to get best results. I am under the impression that Doctor Coxen limits her practice to peridontoclasia and is therefore like many others both in dentistry and medicine, limiting themselves to some special practice, they are apt to become so imbued with their particular specialty that they fail to recognize that merit can emanate from any other source.

In private practice the dental hygienist can do much prophylactic work which will tend to prevent oral diseases. Patients can receive treatment oftener than would otherwise be possible and in many instances the expense incident thereto need not be so great as when done by the dentist. This and her general office work will make preventive dentistry available to a greater number of people than would otherwise be possible. In addition to the important service a dental hygienist can render to the general practitioner, they should make valuable assistants to some of the specialists, expecially to the orthodontists, in doing a limited prophylactic work for their clientele.

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*From the questions answered and the discussion incident thereto, it developed that at least ninety per cent of those present were in favor of some properly safeguarded legislation wherein the interests of the public are conserved, the profession amply safe-guarded and the rights of the dental hygienist sufficiently stimulated to insure a favorable and a remunerative status.

REPORT OF THE COMMITTEE ON DENTAL SCIENCE AND LITERATURE

CALIFORNIA STATE DENTAL ASSOCIATION

(For The Dental Summary)

DENTAL RADIOGRAPHIC PATHOLOGY

By Dr. Leland E. Carter, San Francisco, California

A review of an article by Dr. George Palmer Ratner, New York, N. Y.—*The International Journal of Orthodontia and Oral Surgery*, Vol. VI, No. 6, June, 1920, p. 381.

In this article the author presents a series of cases designed to support his opinion that dental radiography should be practiced only as a specialty.

Briefly his ideas may be outlined as follows:

First, that the production of an interpretable radiogram requires a high degree of technical skill and a thorough knowledge of the anatomy of the parts involved in the examination.

Second, that the ability to interpret a radiogram is dependent not only upon a knowledge of dental anatomy and radiography, but also upon a knowledge of pathology and a wide clinical experience.

Third, that many pathological conditions in the oral cavity are overlooked because the radiographic examination is incomplete and carelessly conducted and because the general practitioner is unfamiliar with many of the radiographic signs that to the initiated betoken pathological conditions.

Fourth, that, inasmuch as the time is coming when the physician in making a physical examination of a patient will insist upon a radiographic examination of the teeth, the same as he now insists upon an examination of the urine and the blood, we must be fully prepared to cooperate with him in a professional manner.

Fifth, that a diagnosis should not be made from radiographic evidence alone, but that due consideration should be given to all other diagnostic methods.

Among the cases presented to support his ideas are the following:

(a) A patient of middle age was operated upon for chronic suppuration in the mandibular third molar region, but the suppuration continued. Radiograms on small plates had not disclosed the cause. An 8 x 10 extra-oral plate disclosed a third molar embedded in the ramus at the angle of the jaw. The molar was removed, and a complete cessation of the suppuration and unventful recovery followed.

Note—First Radiographic examination was incomplete and carelessly conducted.

(b) After the extraction of a lower left first molar, the patient suffered with severe pain for three years. As this pain seemed to localize in certain teeth, these teeth were extracted at intervals until six had been removed. Still the pain continued. As a last resort a surgeon suggested the removal of the gasserian ganglia. Finally a full radiographic examination was made which disclosed a hypodermic needle embedded in the tissues and penetrating the mandibular nerve in the region of the lower left first molar.

Note—This case is of extreme importance in that the patient was about to be operated upon for resection of the gasserian ganglia. At no previous time was a radiographic examination even suggested

(c) Patient suffered for three years from chronic swelling of the submaxillary gland. During this period the gland was lanced to evacuate the pus, but with no permanent relief. Several small radiograms were made and it was decided that the lower left first molar was the cause of the trouble. The dentist very wisely refused to remove the molar because the clinical findings did not agree with the doubtful radiographic diagnosis. An extra-oral plate of the left side of the mandible revealed a salivary stone in the maxillary gland.

Note—With radiograms taken on small films, a tooth which was normal was diagnosed as the cause. After more complete radiographic diagnosis, the entire gland was enucleated and the salivary stone was found.

Other very interesting cases are presented by the author, all of which clearly substantiate his contention that radiography is not everyone's business and that the sooner this fact is realized the better it will be for all concerned.

THE PORCELAIN JACKET CROWN

By W. Carl Wright, San Francisco, California

A comparative commentary based on articles printed in the issues for February and June, 1920, of THE DENTAL SUMMARY by Dr. W. D. Vehe, of Minneapolis, Minn., and Dr. Jesse D. White, St. Louis, Mo.

Dr. Vehe reminds us that porcelain was brought into dental use in the year 1774, and its baking by individual dentists through the employment of gold and platinum matrices about the year 1885, from which time the art of baking porcelain has come more and more into general use, Dr. Land, of Detroit, being the pioneer in porcelain jacket work.

Dr. White supplies us with an excellent glossary of terms and their definitions.

Both authors, preliminary to entering upon a detailed description of the technic, present a few axiomatic principles which we would do well not to forget. To secure uniform results in this extremely exacting art we must be consistent; *e. g.*, given several pieces for fusing, each and every one must be baked at the same temperature and for the same length of time; furthermore, a piece once carried to the proper point of fusion must not be subjected to this temperature subsequently to correct any existing discrepancy; rather use a lower-fusing body.

The higher-fusing bodies give us the maximum translucency due to the burning out of the fluxes employed to facilitate fusion; they are also more porous because of this fact. A good example of this is afforded by grinding well through the glaze of the American or English manufactured porcelain teeth, subsequently repolishing them and then comparing them with the English tube tooth product. The English tube tooth is considerably more dense than our home product.

The quantity of fluxes used in a body (carbonates of sodium and potassium) is inversely proportional to the stability of the fused product; likewise the greater the flux content, the lower the temperature necessary to fuse. The shrinkage, however, is directly proportional to the quantity of fluxes used.

Dr. White advances these figures on shrinkage of porcelain fusing:

Low-fusing body	15 to 25%
High-fusing body	5 to 15%
High-fusing body (block body—hard packed)	3 to 5%

Dr. Vehe prefers in preparing the tooth for the reception of a "jacket" to have the shoulder, at the gingival line, three-quarter mm. in width; to be at right angles to the tooth surface and the margin placed well below the free margin of the gum. Rather to be preferred I think to the wishes of Dr. Scott who desires a full mm. shoulder, at an angle of seventy-five degrees and a wholesale stripping of the enamel of the entire gingival portion of the tooth. The danger of the latter procedure is obvious, because the health of the delicate fibers of attachment of the peridental membrane in this region is jeopardized, particularly where there has been little or no recession of gum tissue.

IMPRESSIONS

Both authors advocate the use of copper bands and modeling compound to obtain impressions of the prepared root. Dr. White goes a step further in advocating an additional or second banded impression to be left on the root while taking the general impression with the same material. Compare this with the more simple, but equally effective technic of Dr. Vehe, who, subsequent to the removal of the banded impression, uses some plastic material such as temporary stopping wax, etc., which he adapts to the tooth between thumb and finger, chills, withdraws, trims and replaces it following it with a general plaster impression. The object, in the minds of both authors, is to remove the auxiliary impression with the larger general one, the purpose of the auxiliary being to supply a more perfect accommodation for the amalgam die reproduction of the prepared tooth, produced from the original banded impression than might be obtained from a general impression minus the auxiliary.

The advantages of the simpler method are obvious. First, a plaster impression is far more apt to be accurate than is one of compound, also more apt to come away intact than is a modeling compound one which though chilled is still subject to warping and distortion.

CARE OF THE TOOTH

Post-operative care of the denuded member is advocated with a thought more for comfort than esthetics by Dr. Vehe. His method is to fashion a ferrule of gutta-percha and when softened with eucalyptol is adapted to the tooth and if necessary cemented on with temporary cement.

Dr. White considers the esthetic in addition to the comfort of the patient and fashions a synthetic jacket which is cemented on with temporary stopping.

AMALGAM DIE

Both are in agreement as to forming the amalgam die with conical shaped root extending into the plaster model. Dr. White goes a little more in detail at this point, emphasizing the importance of specially treating the plaster model after trimming it, by soaking it in molten cocoa butter to render it difficult of subsequent accidental modification; also to have occluding teeth reproduced from the bite impression in a hard material such as Weinstein's investment.

PLATINUM MATRIX

Adaptation of 1/1000 platinum foil to the amalgam die is in one case obtained by cutting the foil from a pattern fashioning it cone-shaped and soldering the joint with pure gold, then burnishing.

Dr. White advocates adaptation by folding over the labial aspect and forming a "tinner's joint" on the lingual, subsequently grinding through the five thicknesses of platinum on the shoulder, to obtain a uniform thickness.

The advantages of the former method need no elaboration, the two thicknesses of the soldered joint can be more safely ground and subjected subsequently to as many reburnishing operations as are desired, with no thought of a recalcitrant flap of platinum folding upon a margin to dismay and confuse.

PACKING OF PORCELAIN

Similar to the method employed in the "Ash's" factory in England Dr. Vehe pours his porcelain into an improvised glazed paper mold, condensing it by vibration and blotting up the expressed moisture. He advocates for beginners two separate stages in the mold formation, one for the preliminary gingival body, and the other, following the low biscuit of the former, for the incisal body.

Dr. White also appreciates the value of well-condensed porcelain, but utilizes a unique method of obtaining such a result. With the matrix in place on the die in the plaster model, he covers his finger with a linen napkin and presses upon the lingual aspect of the prepared tooth, packing the gingival porcelain firmly into the interproximal spaces against the supported linen tooth coat, and approximating plaster teeth, running over to the incisal; then reversing the process by placing the finger to labial aspect. The incisal body is added following the shaping and smoothing of the primary body in a similar fashion, the colors being worked into each other by means of moist sable brushes.

At this point it is worthy of note to observe that both authors appreciate the value of blending the two shades utilized. Dr. Vehe gains such a result by avoiding the preliminary low-biscuit bake of his first mold, pouring the incisal body right over it and by careful vibration, gaining a coalescing of the two bodies, the method, by the way, which is followed in the factories of C. Ash and Son, of London. Dr. White, you will note, endeavors to attain this by using moist sable brushes, although it is possible that he loses some of the condensation he had previously gained, through the addition of water to the already packed porcelain.

Both authors advocate the coating of the shoulder margin of the matrix with shallac or inlay wax, preliminary to any addition of porcelain to obviate distortion of the matrix through the gripping of this part of the matrix by the fusing porcelain and its subsequent shrinkage. Along this line it may be of interest to note that aside from the materials employed by some to prevent this distortion through reinforcing the matrix (alundum cement); but few men have had the termerity to disregard this possibility of distortion. Dr. Walter G. Hine, of Chicago, I believe, originated it and is getting some beautiful results in making anterior jacket crowns in one bake, by a system of condensation through employment of a delicate vibration applied to his finished carved crown, sufficient to slowly express moisture and permitting its blotting up but insufficient to cause a sudden slump into a misshapen mass as we have so often seen them do when vibrated excessively.

TRY-INS

Agreement seems to be in order on the subject of "Try-In" previous to final bake or glazing. The object being to adjust contact occlusion, and modifying shade if necessary. This procedure is extremely hazardous, for two or three reasons; first, a free flap of platinum foil matrix is unsupported at the gingival and may easily be torn free from its connection with the porcelain at the gingival by bending, which point will defy satisfactory repair, and again the crown with its matrix may bind and refuse to go to place, and if pressure is brought upon it, fracture is inevitable, not to mention the fact that what may be in contact at this time may after glazing present a space.

We may all profit by investigating the comparative merits of a series of methods no matter in which department of our work it may be. We are after the system which offers the best results with the minimum amount of failures attending our endeavors to that end.

Beware of the man who says, "my way is the only way."

ORAL SURGERY

By George A. Hodges, Turlock, California

In this first summary report on Oral Surgery for the Committee on Dental Science and Literature of the California State Dental Association, I think it would be fitting to outline the plan I intend to follow.

Oral surgery covers a field so vast that the best results would be obtained and better reference established if but one topic were taken up and disposed of in an issue. Articles in print dealing with any phase of oral surgery are so numerous and present so much repetition that to attempt to quote from very many at a time would be confusing. While endeavoring to confine myself to the main subject, I will avoid its allies, bacteriology, pathology, histology, therapeutics, etc., only making sufficient reference to them that each report may be comprehensible.

Upon completing this series of reports an index will be appended that will afford ready reference to the many sub-topics that shall have been considered. The things that I will endeavor to do are:

First, rehearse the usual technic of each operation without any particular reference to authority.

Second, give the principal variations to the usual methods of procedure at which time I will either quote directly or give references.

The elimination of focal infections seems to be prominently in the minds of the dental profession today. The oral surgeon believes that when there is disease and death of the pericemental membrane in the apical area, therapeutic measures will not suffice and surgical procedure is the only method open if infection is to be eliminated. Two types of procedure are in vogue—one is to remove the offending member in its entirety together with all tissue that is involved by the infection. The other is to resect the diseased root and trust to thorough curettage for the removal of the diseased area. This latter operation is best known as apicoectomy and is the subject of this report.

APICOECTOMY

Common technic presupposing that root-canal and dental tubuli have been sterilized and properly filled.

First, strictly surgical.

Second, produce anesthesia by any method you choose but the best results are obtainable by conduction or combination of conduction and infiltration.

Third, remove gross sepsis from the area by spraying and swabbing.

Fourth, render area more aseptic by washing with seventy per cent. alcohol, drying with filtered and compressed warm air, then paint with seven per cent. iodin. Do not permit the field to again become contaminated from without.

Fifth, make a curved incision, over the point where the tooth is to be resected, through the soft tissue to the alveolar plate.

Sixth, turn the flap back with a blunt periostome, exposing the entire alveolar process over the infected area. This to be determined by the radiographs that should at this time be visible without being handled.

Seventh, stitch the flap out of the way or have it held with retractors by the assistant.

Eighth, expose the diseased area by removing the overlying process with chisels or burs, whichever you choose so long as the landmarks are preserved and no undue trauma is produced.

Ninth, resect the apical end of the root at the floor of the crypt, preferably with a bur of the round or rosebud type, that you may know where you are by digital perception.

Tenth, remove the resected portion from the crypt, enucleating with it the granuloma or if need be remove the diseased area thoroughly with spoon curettes.

Eleventh, cut the root-end down to healthy tissue and smooth it perfectly.

Twelfth, cleanse cavity with normal saline and make sure all debris is removed before painting with seven per cent. iodin or argyrol twenty per cent., or one per cent. solution of brilliant green and crystal violet in fifty per cent. alcohol.

Thirteenth, in most instances suture at once (1) or if you wish to protect the root end from resorption by covering with some sealing agent, you may reduce silver upon it after the method of Dr. Percy Howe (2-3) and then suture.

This operation for apical infection is not as popular as it was because the result of research in this direction tends to prove that the patient to be successfully operated upon must be perfectly normal. To quote—"apicoectomy is indicated where the patient is in good physical condition and the tissues surrounding the abscessed tooth are free from gingivitis and pyorrhea and the root canal and dentin of the root in question are sterile." (2-3). Some contend that the operation is only a culmination to a perfectly successful root-canal operation and never, if any of the following oral pathological conditions are found:

First, acute alveolar abscess with or without a fistula.

Second, granuloma.

Third, exostosis.

Fourth, foreign bodies in root canals. (1).

Others contend that the operation should be performed only when apical infection is present "providing the investing tissues are in perfect health"—no gingivitis or pyorrhea (2-3).

I recommend that you read the papers listed below, together with their discussions:

First, Apicoectomy—The Culmination of Perfect Root-Canal Operations, by S. Sidney Gross, D.D.S., New York City, January, 1920. *Dental Cosmos.*

Second, Apicoectomy—Its Indications and Contra-Indications and Root-Canal Technic, by Thomas B. Hartzell, M.D., D.D.S., Minneapolis, Minn., in *Journal of the National Dental Association,* August, 1920.

Third, Surgical Technic of Apicoectomy, by Chalmers J. Lyons, D.D.S., Ann Arbor, Mich., *Journal of the National Dental Association,* August, 1920.

OH, DOCTOR, GIVE ME GAS!

Even though women dentists are scarce as hens' teeth, young "chickens" should prove good tooth extractors because they are pullets. Happenings at the dentist's are not usually of a humorous character, at least to those who are in the chair. But, funny thing do happen now and then even though firiend dentist does not administer laughing gas. Of course, when mere man is a patient, he finds it rather pleasant when the gentle blond attendant holds his mouth open while the doctor bores away. Without question, the lady patient finds it agreeable to go to the dentist's because so many of the doctors are good looking and so soothing in their manner. Such sympathy is sublime. The jolly jokesmiths of the world press have succeeded in extracting a full set of humor from the domain of the dentist. Everybody finds these jokes great fun when shown on the screen in "Topics of the Day" Films at local theatres.

Now, gentle reader, THE DENTAL SUMMARY presents a dentist's bill of humor so that you may bite at the jokes and if they don't bring a laugh perhaps, they will "cap" you with a gold tooth smile!

He: "Her teeth are like the stars in heaven."
She: "Why?"
He: "They come out at night."—*Dental Facts.*

Tony: "I can't chew this steak, honestly."
Tionette: "No wonder, your teeth are false."—*Rutgers.*

"Bobbie," said the teacher sternly, "where were you yesterday?"
"I had a toothache." "Has it stopped aching?" "I don't know. The dentist kept it."
—*American Legion Weekly.*

There is some hope for the person who can laugh when he has a toothache. But the man who can laugh at you when you have a toothache is beneath words.
—*The Fleur DeLys*

Dentist (about to extract tooth): "Shall I give you gas, Madam?"
Lady Morotist (absent-mindedly): "Yes———and charge it to my husband."
—*Rutgers.*

"What course is Higgins in?"
"Engineering in the College of Dentistry."
"How come engineering in the College of Dentistry?"
"He studies bridgework."—*Ohio Sun dial.*

Dentists build bridges for running talk to flow under 'em.—*It Magazine.*

My dentist has an eagle eye,
And vicious tools he hacks with,
He's clever but I've come to think
He'd make a better blacksmith.—*Vaudeville News.*

—"*Topics of the Day*" *Films.*

EDITORIAL

THOROUGH BRUSHING OF TEETH

Attention of our readers is called to an article in this issue of The Summary on "Mouth Contour Cleansing," by Dr. Henry Barnes. We hope that all will read it carefully and study it, for he gives a method that comes nearer to perfect cleaning of the teeth than any of which we know. And not only thorough cleaning of the teeth but preservation of the normal gum tissue.

In a paper read before the N. O. D. A. in June, 1902, and published in The Dental Summary, Dr. Barnes called attention to injury to the gums and teeth by misuse of the toothbrush, and W. D. Miller corroborated this a few years later through investigations, his findings being published in *The Dental Cosmos* about 1905 or 1907.

For twenty years or more, Dr. Barnes has made a study of tooth brushing. It was his desire to find an efficient method that he could teach his patients that would keep their teeth and mouths in a cleaner and more normal condition, and the results show an increase of cleanliness from ten per cent, some years ago, to ninety percent at the present time.

In solving the problem of thorough interdental brushing, Dr. Barnes has given the profession and laity something of great and lasting benefit.

In an address before the Indiana State Dental Society last May, Dr. Thomas B. Hartzell, of Minneapolis, Minn., said: "Dr. Henry Barnes, of Cleveland, Ohio, first wrote a paper on interdental brushing. His scheme was to prepare little brushes, and insert them between the teeth, and he advised keeping the brushes soaked in water. I have been doing this more or less successfully for some years, and am prepared to say that it is the greatest single advance in the production and maintenance of clean mouths that has been made in the last fifty years." Dr. Hartzell has been a constant advocate of the Barnes method of brushing and has done much to spread the knowledge of the technic among members of the profession.

Probably teeth have suffered more from inefficient brushing than from anything else, and in these days when preventive dentistry is becoming the leading issue, would it not give this practice a great impetus if all dentists would follow the custom of Dr. Barnes and teach their patients how to thoroughly clean the teeth and gums, and then watch the results from time to time as patients return for inspection or service?

Dr. Barnes says he does not believe there is any dentist who can show a better state of cleanliness of mouth and teeth of patients, from their own efforts, than that to be found in his practice.

Thorough brushing of the teeth and gums is the first great step in preventive dentistry, and we hope that dentists everywhere will from now on take a more active interest in the personal care of the mouths and teeth of their patients. The beneficial results that follow will, we believe, be astounding.

SOLUTION OF THE ROOT CANAL PROBLEM

We invite our readers' attention to the article in this issue on the subject: An Operation for Maintaining Tooth Vitality, by Dr. Elmer S. Best, of Minneapolis. It is the result of several years' careful work and investigation to solve our root canal problems.

In referring to this work, Dr. Best says: "As a result of several years of study and observation, I have finally perfected an operation that to my mind practically settles over seventy-five percent of root canal problems."

Those who are familiar with the past investigations of Dr. Best know with what thoroughness they have been conducted, and in an unbiased manner, having in mind only the performance by the dental profession of more perfect dental operations.

The method given in this article is worthy of careful study and trial by every dentist.

TESTIMONIAL BANQUET FOR DR. HARRY M. SEAMANS

Doctor H. M. Semans, Columbus, Ohio, was fittingly honored as the dean of the College of Dentistry, Ohio State University, and as president of the Ohio State Dental Society, with a banquet given at Hotel Deshler, Columbus, Monday evening, May 23rd, by the Ohio Alumni Association of the Psi Omega dental fraternity.

There were present about 150 members and their guests. Mrs. Semans also shared the honors with her husband.

Dr. E. E. Belford, Cleveland, acted as toastmaster and among those who paid tribute to the work of Dr. Semans were: Dr. H. V. Cottrell, Columbus, who spoke on Semans, the Teacher; Dr. F. R. Chapman, Columbus, Secretary Ohio State Dental Society, who responded to the toast, Semans and the Dental Society; Dr. H. E. Friesell,Pittsburgh, dean of the College of Dentistry, University of Pittsburgh, and president of the National Dental Association, who responded to the subject, Semans in the Fraternity; Dr. Homer C. Brown and Dr. Edward C. Mills, of Columbus, Dr. F. M. Casto, dean of the Dental School, Western Reserve University, Cleveland, and others said nice things about Friend Semans. A number of telegrams and letters from out of state dentists were read.

The banquet was followed by a ball and altogether was a most fitting and enjoyable affair

SUGGESTIONS

Conducted by F. R. Chapman, M.S., D.D.S., Columbus, Ohio

(To Our Readers: Give others the benefit of your practical suggestions by sending a description of them to Dr. F. R. Chapman, Schultz Building, Columbus, Ohio.)

Warpage of Plates

If the pink veneer be very thick, or if the denture is taken from the flask and from the model upon which it was formed before it is thoroughly cooled, it may warp from the unequal contraction of the pink veneer and the base plate rubber, and the result may be disastrous to the fit.

—Geo. B. Snow, Dental Digest.

To Clean Carborundum Wheels

Clogged carborundum wheels can be cleansed by placing them in a twenty per cent. solution of nitric acid for a few hours, and then into sodium bicarbonate solution until the acid is neutralized.—*E. P. Bateman, Commonwealth Dental Review.*

Pressure Anesthesia

I have used the following method in pressure anesthesia for devitalization of pulps with good success:

After carrying the pellet of cocain to the tooth on a wisp of cotton dipped in alcohol, place a piece of rubber over the cocain; then take a piece of orangewood stick three-quarters of an inch long; place one end on the rubber, the other end against the opposing tooth. Have the patient close gently, telling him (or her) to bite until he feels it. Thus the pressure is controlled by the patient with the least possible pain and in a minute or two anesthesia will take place without the pain which usually follows this method when pressure is applied by the dentist.

—I. W. Margulies, Dental Cosmos.

To Clean the Inside of Aluminum Plates White as Snow

Take about one teaspoonful of granulated lye, spread on the inside of the plate; leaving lye on one-half minute. Then wash (brush), with about a teaspoonful of hot water and Gold Dust soap—*Charles LeMyre, Dental Facts.*

Sensitive Necks of Teeth

Try ten per cent. Formalin solution painted upon dried surface and burnish with hot burnisher. Burnishing with concentrated solution of silver nitrate in this same way will usually desensitize these surfaces. If, however, you do not get results from either of these methods, paint the surface with Buckley's desensitizing paste and cover with a temporary cement, allowing same to overlap gum and fill interproximal spaces for retention and remain on for two or three hours.—*V. C. S., Dental Digest.*

Cast Clasp Technic

Before taking the impression for a cast clasp I find it a wonderful aid to secure a wax bite, run a plaster model, and then mount on a crown-and-bridge articulator. This is done in order that the pattern may be waxed in such position as not to interfere with the occlusion. This saves the time of grinding the finished clasp, or the discomfort to the patient in grinding the opposing tooth in order to permit the teeth to occlude properly, which is often a great hindrance where no bite is taken.

—*R. L. Williams, Dental Cosmos.*

When the Crown Refuses to Stay Put

In the case of an extremely short bite, where a gold shell crown refuses to stay on, the following method may prove helpful:

Cut off the crown portion of a Davis or similar crown pin from the shoulder; in the open flame, solder this shoulder into the interior of the crown, approximately in the center; drill a hole in the center of the tooth large enough to receive the pin; cement to place.

This method, of course, is applicable only in devitalized teeth, but in these cases it gives great attachment.—*M. Levy, Dental Digest.*

To Prevent Fainting Under Novocain Anesthesia

For the benefit of those who are interested in novocain and for those who are about to take up its use, I may say that for a number of years it has been my practice to give my patients a half teaspoonful of aromatic spirits of ammonia in half a glass of water ten to fifteen minutes before injecting the novocain solution. In following this plan I have not been delayed, have had practically no symptoms of fainting, and the results altogether have been most satisfactory to myself and my patients.

Aromatic spirits of ammonia is a perfectly harmless preventive and I can see no reason for waiting until the patient shows signs of fainting before administering the drug.

I am sure if the members of the dental profession who are using novocain will try the plan I have suggested, they will be more than pleased with the result.—*H. M. Beck, Dental Cosmos.*

To Roughen a Broach

Fold a carborundum paper disk (medium grit) across center and pinch together while drawing broach between folds. If desired to withdraw cotton from canal with broach rotate it backward and forward while drawing through disk. If cotton is to be left in canal with dressing draw through disk without rotation; a slight backward turn will free the broach and leave treatment. Examine prepared broach with magnifying glass and reason will be apparent.—*J. T. Search, Dental Facts.*

Handy Sprues

Your old Victrola needles make good sprues and in many cases can be attached to the wax in the mouth.—*J. F. Nelson, Dental Facts.*

Applying Devitalizing Fiber

First fill the cavity with white temporary stopping and make a small hole in the stopping through which to apply the devitalizing fiber. Cover this with pink stopping and you know just what you are doing.—*James W. Cormahy, Dental Facts.*

Painless Removal of Pulp

A combination of one-eighth gr. of cocain and one drop of carbolic acid applied to the pulp will, after five minutes, enable one to remove it perfectly painlessly.—*Oral Health.*

To Relieve Hard Areas in Denture Work

One of the troublesome features in a full upper denture is the bony prominence in the palate. The old air chamber used to in a measure relieve this, but it was an accident when it did it. Some authorities advise as relief on the model by placing the desired thickness of tin foil at the points where (if their memory serves them true), the bony prominence was. But—here they trust to chance of memory. My plan is to examine carefully with my finger, then cut some tin foil, fold to thickness the relief should be—this to be indicated by the softness or resiliency of the adjoining soft tissues. Now burnish it over the hard parts with your finger, take it out and wet it and dust some gum tragacanth powder over the part that will touch the palate. Dry with some cotton, the part where it is to stick. Now take the impression. If by the Greene Brothers' method it will be retained in the impression during all future manipulations for muscle trimming, etc. When impression is completed remove it carefully before pouring model. You now have an accurate relief with all elements of guess-work eliminated. *Sic transit gloria mundi.—A. T. Lockwood, D.D.S., Fresno, Calif., Pacific Dental Gazette.*

Matrix Using Celluloid

Lock the strip together by cutting on opposite sides, then heat small serrated flat nose pliers and fuse the celluloid by pinching with the heated pliers. The celluloid in kodak films is suitable for this work when the coating is removed. To remove coating wash in hot water.—*E. T. Evans, Dental Facts.*

Preparing Cases for Flasking

A method of smoothing up cases after they are made as smooth as possible with wax knife, etc., preparatory to flasking, is as follows:

Obtain a piece of glass tubing about eight inches long and about the diameter of a lead pencil. Hold each end in the hands, and place the center over the Bunsen. When the glass starts to melt, pull the hands apart, which will leave the ends of the tubing drawn out to a fine point. Place one of the untouched ends into a piece of rubber tubing attached to the gas supply, turn on the gas; then break off a piece of the fine end just sufficient to allow enough gas to escape, so as when lighted the flame will only be one-half inch or less in length. If the flame is too big, place the tip in the Bunsen again; the glass will melt, and so make the hole smaller. (This flame is too small to carbonize).

Then use this small flame and brush over the wax and between the teeth. If carefully used the wax will not run.

This, too, can be used to smooth up the wax used in casting plates. Also can be used instead of the mouth blowpipe in "muscle trimming," as suggested by Mr. Fripp.—*Gordon C. Barkley, D.D.S., Sydney, Dental Science Journal of Australia.*

Distilled Water in Pyorrhea

The writer has prescribed to his patients for the past twenty years the liberal and continual use of distilled water, and finds where it is faithfully used that the deposits on the teeth are soft, if there are any at all, and there is no irritation caused by whatever deposit there is.

The writer fully believes and it is carried out in practice that at the age salivary calculus begins to deposit, the system is showing that it has an excess of minerals be depositing calculus on the surfaces of the teeth. It is then time, after proper prophylactic precautions have been taken, to prescribe the drinking of distilled water to the exclusion of other water. The tea, coffee and cocoa should be made with distilled water. You should specify "double distilled water," as the kind used for storage batteries is not pure enough.

It is the writer's opinion that where considerable deposits of salivary calculus are on the teeth that you will find symptoms of calcic deposits throughout the system, and the curing of pyorrhea does not necessarily mean that the patient will be restored to health unless the cause, viz., calcic deposits, is removed permanently. It is also necessary that the patient should have an active system and the bowels kept open, preferably without the use of either laxatives or cathartics but with proper foods.

Physicians have been advising their patients for years to "drink lots of water." That was good as far as it went, but had they specified "double distilled water" they would have been on the right track. So let me repeat one suggestion, have the patient drink and use the distilled water exclusively and you watch the results.

Do not confound boiled water with distilled water. Boiled water still has the minerals in it, only the animal matter has been eliminated.

The water company in our city manufactures the distilled water for drinking purposes, and when the water is served cold is as good a drink as any spring water. If distilled water cannot be purchased, advise the patient to buy a still and distill his own.—*D. R. Beebe, National Dental Journal.*

Should All Pulpless and Impacted Teeth be Removed?

The essayist's opinion as to what he believes to be appropriate practice in the management of these cases until additional evidence is presented.

(a) In my opinion sufficient evidence has not been secured by either the medical or dental profession to warrant a discontinuance of the filling of all root canals in teeth having normal supporting tissues if the size of these canals favors placing a filling to the apex—providing this is done under the rigid aseptic conditions as now practiced, unless the patient in question is suffering from some serious systemic disease that might be detrimentally influenced by even a temporary infection if one should occur at the apex of the tooth.

(b) Until the advocates of the rather universal filling of root-canals can present additional evidence of the permanency of controlling the infection beyond a treated tooth, it is my opinion one is not warranted in advising a patient to have the root-canal filled in a tooth about which exists a chronic periapical infection that has resulted in the destruction of the pericemental fibers. The only exception I would make to the foregoing statement (b) is where a patient has never suffered from a disease that might be influenced by a chronic infection, and the tooth is one that experience has taught us to consider a favorable risk for root amputation.

The results obtained in the operation of root end amputations by even our best operators have not been such as to make the conservative practitioner promise a patient that there is any certainty that he will retain such a tooth for a given number of years, or that it positively will be free from an infected area for any length of time. However, there is some apparent clinical evidence that infection is eradicated in a certain percentage of such cases; therefore, I have not abandoned root amputation entirely, but my records show I have only performed it twice in the last ten months and in both instances the patient was a woman and the tooth involved the superior central incisor with less than one-third of the root-end affected.

With the evidence presented by our investigators and clinicians it would seem that the profession is not warranted to entirely discontinue the filling of root-canals, but we surely have passed the point where the dental profession can with justification fill all teeth having sufficient supporting structures to retain them comfortably in the jaws in spite of the fact the apex is denuded and is forming a portion of the wall of an infected field.—*W. H. G. Logan, National Dental Journal.*

CORRESPONDENCE

EXTERNAL ALVEOLECTOMY

To the Editor:

In view of the widespread interest at the present time in the dangers emanating from dead teeth, I feel sure that the readers of The Dental Summary will appreciate the following:

In the *Journal of the National Dental Association* for June, 1920, appeared an article on "External Alveolectomy" for the removal of dead teeth and their pathologic products, by William Lete Shearer, M.D., D.D.S.

Dr. Shearer summarizes the operation that he describes as follows:

(a) Novocain nerve block anesthesia.

(b) The teeth are removed, the mucoperiosteum is reflected up to the root-ends of the tooth sockets, the external alveolar plate of bone is taken off, the diseased tissue is attended to under the eye.

(c) The bone is smoothed, leaving no jagged edges, the lingual, buccal, gingival musoca trimmed and sutured with horsehair.

(d) The sutures are removed in from four to five days.

In all esssentials this operation is precisely the same as that which I have been describing and advocating ever since early in the year 1915. This will be made clear by a comparison of Dr. Shearer's article with my accounts in:

Pacific Dental Gazette, March, 1915.
Pacific Dental Gazette, May, 1915.
Transaction of the Panama Pac. Dental Congress, Aug. Sept. 1915.
Cal. State Journal of Medicine, November, 1915.
Pacific Dental Gazette, February, 1917.
American Journal of Surgery, August, September, 1917.
Journal of the California State Dental Association, Nov. Dec. 1917.
American Journal of Surgery, March, 1918.
New York Medical Journal, March, 1918.
The Journal of the National Dental Association, June, 1918.
Journal of the California State Dental Association, June, 1918.
American Journal of Surgery, February, 1919.
Medical Review of Reviews, February, 1919.
The Dental Summary, June, 1919.
The Dental Summary, July, 1919.
The Journal of the California State Dental Association, July, 1919.
California State Journal of Medicine, September, 1919.
The Southern Medical Journal, September, 1919.
Illinois Medical Journal, August, 1920.

Sincerely, Josef Novitzky, D.D.S.

OBITUARY

GEORGE ALEXANDER BOWMAN, D. D. S.

TWELFTH PRESIDENT

BY BURTON LEE THORPE, GOTHAM APTS., KANSAS CITY, MO.

GEORGE Alexander Bowman, son of Joseph and Asenath Bowman, was born at Barnard, Vt., June 6, 1839. His early boyhood was spent on his father's farm. He attended the common school in his native village, and also had an academic course at Royalton and Newbury, Vt. Dr. N. W. Gilbert, an itinerant dentist, visited his father's home; his exhibition of a case of fine dental instruments and some skillful dental operations, in which young Bowman was interested, was the incentive that led him into dentistry.

He entered the office of Dr. Gilbert, of Lowell, Mass., October, 1857. A year's tutelage with him and Dr. H. N. Roberts, of Ludlow, Vt., was deemed sufficient to enable young Bowman to open an office at Canton, St. Lawrence county, New York, October 8, 1858, where in company with his brother, the late Dr. J. A. Bowman, of Minneapolis, he practiced until September 20, 1862, when he came West, locating at St. Anthony's Falls, Minn. (now East Minneapolis). Here he stayed a year and a half. In May, 1865, he opened an office in Milwaukee. This he sold in October, and came to St. Louis, arriving November 9, 1865, first becoming associated with Dr. Isaiah Forbes, with whom he remained four years. Here he practiced until 1918 when he retired.

Dr. Bowman assisted in organizing the Missouri Dental College, chartered September 16, 1866, in which he was the first demonstrator of prosthetic dentistry, and for years a member of the Board of Trustees, and of the Clinical Staff. From this institution he received the D.D. S. degree February 22, 1867, at the first commencement exercises. He and Dr. A. W. French, of Springfield, Ill., were the only members of this class, and the oldest graduates of the school. He was President of the Missouri Dental College Alumni Association in 1891.

Dr. Bowman joined the Missouri State Dental Association June 4, 1867; was its Secretary 1870-1-2, Vice-President, 1875, and President 1876. He was President of the St. Louis Dental Society in 1873. He was an honorary member of the Illinois and Iowa State Dental Associations, and President of the St. Louis Society of Dental Science, 1908.

If Dr. Bowman was anything, he was both an optimist and enthusiast, always ready to learn from the humblest member of the profession and equally ready to instruct. He was always experimenting with the new things in dentistry. Of an ingenious turn, Dr. Bowman invented a number of useful instruments, amongst them a gum retractor, which preceded the present rubber dam clamp. This was put on the market by the S. S. White Co.; also an improved clamp forceps, manufactured by S. S. White Co., and known as the "Bowman-Allen forceps," as well as a mouth mirror and cheek retractor. He was the first to use gutta-percha root canal points. With an exceptional skill as an operator, he did much to ornament and enhance his profession. His operations were all of the highest order of excellence.

He was married March 17, 1864, to Miss Jennie E. Homer. To them were born George Homer, Birdie Bell (D. D. S.), Jennie Elizabeth, Grace Adelle, Paul Homer, Ariadne Josephine, and Florence Hope.

In politics Dr. Bowman was a Republican. He had no church affiliations, believing in "the fatherhood of God and the brotherhood of man" in the true sense of the word. In secret societies, Dr. Bowman had been a "jiner." He was a Knight Templar, of the Masons, a member of the I. O. O. F., Knights of Pythias, Royal Arcanum and Legion of Honor, in all f which he had filled the highest offices, and been prominent in the ritualistic and dramatic work. Possessing a fine tenor voice, he sang for twelve years in St. Louis church choirs, also took a prominent part in amateur operas, oratorios, etc. He was a member of the old Philharmonic Society and of the Oratorio Society, as well as of the St. Louis Club and the St. Louis Jockey Club.

The St. Louis Society of Dental Science, of which Dr. Bowman was President, 1908, in recognition of his long and useful career and his contributions to dental surgery, gave a dinner in his honor on his golden jubilee at the Jefferson Hotel, October 8. Dr. Burton Lee Thorpe responded to the toast "Our Guest and Why We Honor Him." Dr. Thorpe presented, on behalf of the society, a very beautiful loving cup.

Dr. Bowman's death on April 2nd came so peacefully that it was like a benediction in the passing of his lovable spirit.

DR. MARTIN IS DEAD

As we go to press news comes of the death of Dr. George B. Martin, at his home, Frankfort, Indiana, Wednesday evening, June 1, of paralysis. Dr. Martin is widely known as the orginal producer of the treatment for pyorrhea that bears his name.

His early work in inlay casting had much to do with freeing the dental profession from the menace of infringement suits under certain process patents.

SOCIETY ANNOUNCEMENTS

Indiana State

Indiana State Dental Association which convened in Indianapolis May 16-17-18, 1921, was one of the best and most largely attended meetings yet held. About 800 members were present.

Dr. C. R. Jackson, Indianapolis, is the new president for the ensuing year, and Dr. Earl Brooks, of Noblesville, was elected president-elect. Dr. A. J. Kimm, secretary. Dr. Frank A. Hamilton, Indianapolis, is chairman Board of Directors, and Dr. H. C. McKittrick, Indianapolis, Dr. V. H. Knapp, Evansville and Dr. R. R. Gillis, Hammond, were elected members of the State Board of Dental Examiners.

The transactions of the meeting will be published in future issues of *The Dental Summary.*

South Carolina State Board of Examiners

The annual meeting of the South Carolina State Board of Dental Examiners, will be held at Greenville (Park School), S. C., beginning at 9 o'clock Monday morning, June 13th, 1921.

Application blanks and further information may be obtained by addressing: Dr. R. L. Spencer, Secty., Bennettsville, S. C.

The Association of Military Dental Surgeons of the United States

The Eighth annual meeting of the Association of Military Dental Surgeons will be held at Milwaukee, August 16-17, 1921.

G. H. Casaday,
Secretary-Treasurer.

Virginia State Dental Association

The fifty-second annual session of the Virginia State Dental Association will be held in the Jefferson Hotel, Richmond, Virginia, October 11th to 14th.

Michigan State Dental Examination

The next examination for candidates to practice dentistry in this State will be held by the Dental Examining Board at Ann Arbor the week of June 20 to 25 inclusive. The examination starts at eight o'clock sharp on the first day. The candidates must have credentials in the hands of the Secretary ten days previous to this examination. For all further information, application blanks, etc., address E. O. Gillespie, Secretary, 1541 David Whitney Building, Detroit, Mich.

RESOLUTIONS BEFORE THE CHICAGO DENTAL SOCIETY ON THE DEATH OF DR. GARRETT NEWKIRK

Whereas, This society has received word of the death of Doctor Garrett Newkirk, and

Whereas, Doctor Newkirk was a former member of this society, and was identified with the profession in Illinois for many years, and

Whereas, He was a man of distinguished ability in his chosen profession, as well as a writer of note in the field of general literature, and

Whereas, He was possesed of a lovable personality, and was endeared to the members of this society in a very unusual way, therefore, be it

Resolved, That we, in session assembled, wish to go on record as expressing our deep appreciation of his many sterling qualities, and our profound sorrow at his passing away, and

Resolved, That these resolutions be made a part of our records and that the Secretary be instructed to send a copy to Mrs. Newkirk, and to the journals for publication.

Signed: C. N. Johnson,
J. G. Reid,
L. L. Davis..

North Dakota State Board

The next meeting of the State Board of Dental Examiners will be held in Fargo, beginning at nine o'clock Tuesday morning, July 12. All applications must be filed with the Secretary at least ten days before the examination. For further information write W. E. Hocking, Devils Lake, N. D.

Gov. Mechem, New Mexico, has appointed the following to be members of the State Board of Dental Examiners: F. E. Morton, Hurley; J. R. Gaines, Gallup; J. J. Clark, Artesia; C. A. Eller. Albuquerque, and C. C. Clark, Socorro.

This announcement was incorrectly made in the May issue, assigning the appointment to Texas instead of New Mexico.

Wisconsin State Board

The Wisconsin State Board of Dental Examiners will conduct a licensing examination at the Marquette Dental College, in Milwaukee, beginning Saturday, June 18, and continuing to Saturday, June 25, 1921.

The Wisconsin dental law provides that, "No person shall be examined by the board for a license to practice dentistry in this state, who shall not file with the secretary of the board, credentials proving to the satisfaction of the board, that he has a general education equivalent to that required for graduation from a high school or academy in the state of Wisconsin, having a four-year course beyond that of the eighth grade of the elementary school, and who is not a regular graduate of a reputable dental college or dental department of a university."

All credentials should be in the hands of the secretary of the board not later than June 5, 1921.

WILLIAM KETTLER, *Secretary,*
480 Berlin Arcade, Milwaukee, Wis.

North Carolina Dental Society

The date of the annual meeting of the North Carolina Dental Society has been changed from June 21-23 to June 28-30, 1921.

Yours very truly,
H. O. LINEBERGER, *Secretary.*

The Board of Dental Examiners of Alabama

The Board of Dental Examiners of Alabama will meet Monday, June 20, 1921, at nine o'clock A.M., at the Birmingham Dental College, Avenue F and 20th street, Birmingham, Alabama, for the purpose of examining applicants who hold diplomas from reputable dental colleges, for certificate of qualification to practice dentistry in Alabama.

All applications accompanied by the examination fee must be filed with the secretary-treasurer at least one week before the examination. For further information, application blanks, etc., address

H. CLAY HASSELL, *Secretary-Treasurer,*
616 22nd Avenue, Tuscaloosa, Alabama.

Pennsylvania State Board

The next regular examination of the Pennsylvania Board of Dental Examiners will be held in Philadelphia and Pittsburgh, Wednesday, Thursday, Friday and Saturday, June 22, 23, 24 and 25. The theoretical examinations will be held in Musical Fund Hall, 808 Locust Street, Philadelphia and the College of Pharmacy Building, Bride and Bluff Streets, Pittsburgh, on Wednesday, Thursday and Friday, June 22, 23, 24. The practical examinations will be held on Saturday, June 25, in the Evans Dental Institute, Philadelphia and the University of Pittsburgh, Pittsburgh.

Students who present evidence of having passed their second year examinations in June, may appear for the divided examinations on Wednesday and Thursday, June 22 and 23, in anatomy, physiology, dental anatomy, histology, metallurgy, chemistry and bacteriology.

A law having been enacted at the recent session of the legislature licensing dental hygienists, an examination will be held on Wednesday, Thursday and Saturday, June 22, 23 and 25, at the above places.

Application papers may be secured from the Department of Public Instruction, Harrisburg. For further information address

ALEXANDER H. REYNOLDS, *Secretary*,
4630 Chester Avenue, Philadelphia.

National Dental Association Meeting

Milwaukee, August 15 to 19, 1921, inclusive.

Milwaukee, metropolis of Wisconsin, famed from coast to coast for its homes, health, and hospitality, as well as for the fact that it is the greatest convention city in the middle west, will act as a great reception committee and hostess to the 8000 or more delegates, visitors, and guests, attending the twenty-fifth or Silver Anniversary Convention of the National Dental Association, on August 15 to 19, 1921.

Those who come to Milwaukee during the National Dental Convention are assured of a most interesting and entertaining visit, evidence of which is furnished in the fact that during 1920 the Badger Metropolis of nearly a half million persons played host and hostess to more than 200 convention bodies, ranging from county and state to national organizations.

Milwaukee's Auditorium, an ornate structure right in the heart of the city, erected at a cost of $1,500,000, will be the scene of the great gathering of representatives of the dental profession and its allied activities. The Auditorium, conceded without argument, to be the finest and most commodious, as well as the most conveniently arranged convention or exposition building in the world, covers an entire block within walking distance of the business district and hotels. The massive structure embraces within its expansiveness, six separate minor auditoriums under one roof, the smallest of which seats 300 persons, and the largest having accommodation for 10,000. Mechanics Hall, in the building in which the dental exhibit will be held, adds 46,000 square feet of floor space for exhibition purposes, making a total floor space for exhibits of 103,000 square feet.

Milwaukee's hotels, which have a national reputation for excellence and genuine hospitality, not forced by commercialism, but spontaneous because of the very nature of things, are making elaborate preparations to provide for the comfort, convenience, and pleasure of the thousands of guests who will register within their walls. With more than twenty hostelries of high standing, few cities are better equipped or capable of handling so many transients at one time. The respective houses are well ordered for entertaining the heavy business, tourist and convention traffic.

Management of the various hotels have already reported reservations for the convention in August, which is indicative of the fact that the entire country from coast to coast, and north to south, will have representation at the great Silver Anniversary gathering of one of the leading professions. The list of Milwaukee's leading hotels, the proprietors of which have given the convention committee full assurance of complete cooperation in providing for the thousands of visitors on August 15 to 19, are: Milwaukee Athletic Club, Mason and Broadway; Hotel Aberdeen, 909 Grand avenue; Hotel Blatz, East Water street, corner of Oneida street; Hotel Carlton, Milwaukee street; Hotel Charlotte, 138 Third street; Hotel Gilpatrick, 223 Third street; Globe Hotel, corner Wisconsin and Cass streets; Hotel Juneau, 225 Wisconsin street; Hotel Marquette, 188 Wisconsin street; Hotel Maryland, 137 Fourth street; Hotel Martin, Wisconsin street; Hotel Medford, corner Third and Sycamore streets; Hotel Miller, Third street, near Grand avenue; Hotel Pfister, Wisconsin and Jefferson streets; Hotel Plankinton, West Water and Sycamore streets; Republican House, Third and Cedar streets; Hotel Randolph, 134 Third street; Schlitz Hotel, Grand avenue and third street; Hotel St. Charles, City Hall Square; Hotel Wisconsin, Third street, near Grand avenue.

Idaho State

The second annual Post-Graduate Course of the Idaho State Dental Association will be held in Boise, June 27, 28, 29, 30, July 1, 2, inclusive.

Class instructors—Dr. D. D. Campbell—Full Denture Construction. Dr. Arthur E. Smith—Oral Surgery, Exodontia, Anesthesia.

Very truly,
L. G. PHILLIPS, *President,* Jerome, Idaho.
M. J. GOODE, *Secretary,* Filer, Idaho.

Indiana State Board

The Indiana State Board of Dental Examiners will hold its next examination in Indianapolis, June 20 to 25. For application and instructions write to H. C. McKittrick, D.D.S., 1006 Odd Fellow Bldg., Indianapolis, Indiana.

H. C. MCKITTRICK, *Secy.-Treas.*

NEW PUBLICATIONS

Index of the Periodical Dental Literature, published in the English language including sixty-five publications in England, Scotland, Canada, Australia, New Zealand, and the United States, for the years 1911-1915.

A classified subject-index, on the plan of the Dewey Decimal Classification. An alphabetical Author index. A list of Dental Books published during the same period. Compiled by Arthur D. Black, A. M., M. D., D. D.S., Sc. D., Dean Northwestern University Dental School.

Published by the Dental Index Bureau, under the auspices of the American Institute of Dental Teachers, 1921.

The Index is in two parts:

Part I *is a classified subject index* of papers, discussions and clinics as published in dental journals in the United States, England, Canada, Australia and New Zealand.

Part II *is an alphabetically arranged author's index*, giving a list of books, papers, discussions and clinics—a complete record of the contributions of each man towards the progress of the profession, as recorded in our journals.

The classified subject index fills 260 pages and includes about 20,000 titles, which gives some idea of the thoroughness with which the work of classifying has been performed.

The plan of the index is that known as the Dewey Decimal Classification, by which the titles of all of the articles on each subject are listed together in the Index without regard to the wording of the titles. The main divisions for dentistry are given.

Most of the main headings are subdivided many times. For example, there are twenty-three subdivisions of operative dentistry, the most important including instruments and appliances, filling teeth with gold, amalgam, inlays of gold and porcelain, pulp treatment, prophylaxis, etc. Each main division has as many subdivisions as are necessary for a satisfactory classification of the articles.

This scheme of grouping the articles under a number of main divisions makes the Index exceptionally desirable and convenient for the specialists, the number of whom is rapidly increasing. The orthodontist, the oral surgeon, or the prosthetist will each find for his use a separate index which includes all of the articles within his field and none outside of it. Likewise the teachers in our colleges will find special groupings of the articles for their special fields. The dentist who wishes to write a paper for his society may, after choosing his subject, turn to a list of articles on that subject without the necessity of searching through a mass of other material.

The Index goes even farther in the matter of convenience. For each heading, the list of articles is arranged according to the journals in which they appeared, the names of the journals being arranged alphabetically. Thus one may confine his search to those journals to which he has access, if he so desires. The Index goes even one step farther; for each dental journal, the articles appearing in each volume are grouped; and the list is printed in the order in which the articles were published.

For example, if one should care to write a paper on gold inlays, he would find under that heading a list of the dental journals arranged alphabetically, then for each of the five volumes (1911 to 1915) of each journal, will be found a separate heading, followed by a list of the articles on gold inlays published in that volume, and the list arranged in the order in which the articles appeared.

The latter half of the book, 206 pages, contains about 30,000 references arranged alphabetically by authors. These references include books, papers, clinics, discussions, bibliographical sketches and other items of value for future reference. Almost every dentist who has participated in the activities of the societies to which he belongs, will be surprised at the completeness of the record. In each case, it is probably more complete than the individual could have kept it for himself, because he would likely miss many references copied from one journal by another.

In addition, the value of this Author Index to the individual in recording his own writings, there is, of course, the opportunity to look up and review the work of any member of the profession, as may be desired.

Another five year volume of the Index is in preparation, for the years 1916-1920. This should be ready within a year. We will then have the past decade completely indexed. It is proposed to continue thereafter with the publication of annual volumes with paper covers, and combine these for each five-year period into a single cloth-bound volume. After the annual publications are established, it is hoped that means may be found to publish several volumes covering the period from 1839 to 1910. It is estimated that one volume might include everything from 1839 to 1875, another 1875 to 1890, another 1890 to 1900, and two more the decade from 1901 to 1910.

The fact should be impressed that the publication of this Index has been a matter of sacrifice, not a scheme for profit. Our Dental Colleges, a group of individuals and a few dental journals and societies contributed about $4,300.00 without expecting anything in return. Another group, among them many of the same men who have contributed before, guaranted to prorate any deficit which might be incurred. It is not, therefore, a question of making money, but one of the size of the deficit.

The National Dental Association has voted $2,000.00 to apply on the 1916-1920 volume and it is hoped that there will be enough regular subscribers to pay the balance of the cost. The annual volumes should be self supporting.

The edition is limited and is being sold upon subscription only. The price is $6.00 for all points of delivery within the United States and $6.50 (New York exchange) postpaid to all foreign points. Remittances should be made at onec to Dr. Abram Hoffman, Secretary-Treasurer, 381 Linwood Ave., Buffalo, V. Y.

The American Year-Book of Anesthesia and Analgesia, 1917-1918. (Copyrighted January, 1921.) F. H. McMechan, M. D., Editor. Large quarto, bound in art buckram and printed on natural tint paper, 471 text pages, 175 illustrations. Containing a cumulative Index of the pertinent literature for 1917-1918 and contributions by eighty-four eminent authorities. Surgery Publishing Co., Publishers, 15 East 26th St., New York City. Price $10.

The American Year-Book of Anesthesia and Analgesia, (Copyrighted January 1921), covering the advances in these subjects during 1917-1918, is just at hand in its de luxe format, making as much of a typographical as a scientific appeal. Delayed in publication by the World War, it contains those methods of anesthesia and analgesia introduced to expedite military surgery, which are to find a place for themselves in civilian practice for the benefit of all concerned.

Again the Editor of the Year-Book has tried to make it appeal to all the progressve members of the allied professions and specialties, who, in any way, are vitally interested in current advances in the science and art of anesthesia and analgesia.

The Year-Book as a cumulative Encyclopedia, provides the anesthetist, specialist, surgeon, dentist, research worker and hospital superintendent with those special advancess that meet their individual requirements.

Fundamental studies in the pharmaco-physio-pathology of anesthesia and analgesia, of exceptional merit, have been included, and as many of them have a direct bearing on the clinical handling of patients submitting to operations under narcosis, they are doubly significant and valuable.

All pertinent phases of the science and practice of anesthesia and analgesia, during 1917-1918, have been covered in collated papers and researches from the most prominent international authorities and the Year-Book is again a comprehensive and exhaustive post-graduate course. To those interested it is not a luxury but an everyday necessity as a reference volume.

Aside from series of contributions on complicating and safety factors of anesthesia, acidosis, blood changes, blood pressure variations, pharmaco-physio-pathological studies both in general and local anesthesia, methods of technic, especially those developed in war surgery and the newer methods of local analgesia in surgery, dentistry and the specialties, the Year-Book contains a Cumulative Index of the Pertinent Literature for 1917-1918, which is invaluable to anyone making a study of any phases of these subjects and needing the necessary bibliography for reference or teaching.

Quinquennial Catalogue of the Dental School of Harvard University, 1869-1920. Published by the Dental School, 1920. Dr. W. E. Boardman, Editor.

This book is different from most college catalogues in that it is bound in cloth, and aside from the regular catalogue material it contains many graduating class pictures and the story of the activities of all the graduates and non-graduates who served in the army of the United States, Great Britain, France, or allied service, Red Cross or otherwise, at home or abroad, thus making it a war record of the school's activities during a remarkable period of the world's history. It gives a chronological and also a geographical list of graduates.

It is well gotten up, well printed and reflects credit on its genial Editor, Dr. Boardman

Teeth and Health. How to lengthen Life and Increase Happiness by Proper Care. By Thomas J. Ryan, D. D. S., and Edwin F. Bowers, M. D. New York and London; G. P. Putnam's Sons. Published, 1921.

In this book of some 260 pages is presented in a popular manner, much information about the teeth and their diseases and the resultant influence on the health of individuals particularly children.

It is written in an interesting style and in language everyone can understand and the information it contains is of great value to the laity. It is also a most excellent book for the reception room table, and should be found in every dental office.

The subject matter is treated in seventeen chapters as follows: I—The Real Meaning of Teeth; II—Tooth Care Commences with the grandparents; III—Why the mother should nurse her child; IV—What mothers should know; V—Helping baby with his teeth; VI—The Teeth of children; VII—How sugar sucks the Lime out of Teeth; VIII—Crooked Teeth and Twisted Brains; IX—Pyorrhea—its Cause and Cure; X—Focal Infection; XI—Teeth and Health; XII—Epilepsy may be caused by tooth decay; XIII—Why we need an X-Ray examination; XIV—How Zone Therapy relieves Tooth Pains; XV—Mouth washes, Tooth Paste, Apples and Toothbrushes; XVI—The Dental Dispensary in Industry; XVII—Free Dental Clinics—The Country's greatest need;—How I found Health in a Dentist's chair—Index.

The Dental Science Journal of Australia is the name of the new dental journal that succeeds *the Commonwealth Dental Review* which has been discontinued.

The new journal is published by the Society of Dental Science of Australia and its editor is Dr. Percy A. Ash, Sydney. Although we have always enjoyed the *Commonwealth Dental Review*, we see a great improvement in the new journal both in material and make up, and we wish the editor and publishers every success in the conduct of the *Dental Science Journal of Australia*.

DENTAL HYGIENIST WANTED BY U. S.

Applications will be Rated as Received until August 1, 1921

The United States Civil Service Commission announces an open competitive examination for dental hygienist. Vacancies in the Public Health Service throughout the United States at $720 a year, plus quarters, subsistence, and laundry, where these are available, and vacancies in positions requiring similar qualifications, at this or higher or lower salaries, will be filled from this examination, unless it is found in the interest of the service to fill any vacancy by reinstatement, transfer, or promotion.

Bonus—Appointees whose services are satisfactory may be allowed the increase granted by Congress of $20 a month.

Citizenship and sex—All citizens of the United States who meet the requirements, both men and women, may enter this examination; appointing officers, however, have the legal right to specify the sex desired in requesting certification of eligibles.

On account of the needs of the service, papers will be rated as received and certification made as the needs of the service require. In the absence of further notice, applications for these examinations will be received by the Commission at Washington, D. C., until the hour of closing business on August 1, 1921.....If sufficient eligibles are obtained the receipt of applications may be closed before that date, of which due notice will be given.

Subjects and weights.—Competitors will not be required to report for examination at any place, but will be rated on the following subjects, which will have the relative weights indicated:

	Subjects	*Weights*
1.	Physical ability	25
2.	Education and experience	75
	Total	100

Basis of ratings—Under the second subject the ratings will be based upon competitors' sworn statements in their applications and upon corroborative evidence.

Registers and requirements—Two registers of eligibles will be established from this examination, as follows:

(A) Those who have completed the eighth grade of common school and are graduates from an approved school of dental hygiene; or from some recognized dental college.

(B) Those who are not graduates, but have had private training in a dental office for a period equal to that in a school of dental hygiene; or who have been accepted for registration by a State recognizing dental or oral hygienists. Register (B) will be used for appointment when eligibles from Register (A) are not available.

Age—Applicants must not have reached their seventieth birthday on the date of making oath to the application. At the request of an appointing officer certification will be made of eligibles who are within reasonable age limits.

Retirement—Classified employees who have reached the retirement age and have served fifteen years are entitled to retirement with an annuity. A deduction of 2½ per cent is made from the monthly salary to provide for this annuity, which will be returned to persons leaving the service before retirement with 4 per cent interest compounded annually.

Photographs—Applicants must submit with their applications their unmounted photographs, taken within two years, with their names written thereon. Proofs or group photographs will not be accepted. Photographs will not be returned to applicants.

Medical certificate—The medical certificate in the application form should be executed by a medical officer of the Public Health Service where practicable.

Applications—Applicants should at once apply for Form 1312, stating the title of the examination desired, to the Civil Service Commission, Washington, D. C.; the Secretary of the United States Civil Service Board, Customhouse, Boston, Mass., New York, N. Y., New Orleans, La., Honolulu, Hawaii; Post Office, Philadelphia, Pa., Atlanta, Ga., Cincinnati, Ohio, Chicago, Ill., St. Paul, Minn., Seattle, Wash., San Francisco, Calif., Denver, Colo.; Old Customhouse, St. Louis, Mo., Administration Building, Balboa Heights, Canal Zone; or to the Chairman of the Porto Rican Civil Service Commission, San Juan, P. R.

Applications should be properly executed, *including the medical certificate*, but excluding the county officer's certificate, and filed with the Civil Service Commission, Washington, D. C., without delay.

The exact title of the examination, as given at the head of this announcement, should be stated in the application form.

Preference—Applications entitled to preference should attach to their applications their original discharge, or a photostat or certified copy thereof, or their official record of service, which will be returned after inspection.

Issued April 29, 1921.

Dental Laboratory Association

A movement destined to be of far-reaching importance to the dental profession, in that it seeks to organize dental laboratories and lift them from their present purely commercial relation with dentistry to a more lofty and professional plane, was instituted in Boston, last August, during the meeting of the National Dental Association by a group of the larger dental laboratory owners.

At that meeting were Mr. Sam'l. G. Supplee, of New York; Mr. Martinez, of Saint Paul, Minn.; Mr. Van Houten, of Newark, N. J.; Mr. I. J. Dresch, of Toledo, Ohio; Dr. Gropper, of Milwaukee, Wis., representing Bundee and Upmeyer; Mr. Fairbanks, representing the Boston Dental Laboratory, Boston, Mass.; Mr. Herriott, representing Mrs. Wm. Herriott & Son, Indianapolis, Ind.; Mr. V. Fortunati, of New York; Mr. E. C. Bennett and Mr. F. Drury, representing Sam'l. G. Supplee & Company, of New York. Also present as guests were these representatives of the National Society of Dental Prosthetists: Dr. Lowry, of Detroit, Mich.; Dr. Orton, of Saint Paul, Minn.; Dr. M. M. House, of Indianapolis, Ind., and Dr. Giffen, of Detroit, Mich.

This group of men formed an association which is now known under the temporary name of the Society of American Dental Laboratories.

The temporary officers appointed by the Chairman, Mr. Sam'l. G. Supplee are as follows: President, Mr. B. Martinez; secretary, Mr. Sam'l. G. Supplee; treasurer, Mr. I. J. Dresch; program committee, chairman, Mr. H. P. Boos; constitution and by-laws, chairman. Mr. A. Van Houten.

The second meeting of the society was held in Chicago, January 28, 1921, at which a constitution and by-laws were drafted to be brought up for adoption at the next meeting Steps toward effecting a permanent organization will be taken at a meeting to be called in Milwaukee, in 1921, during the convention of the National Dental Society and the National Society of Denture Prosthetists.

The purpose of the Society of American Dental Laboratories as outlined in the constitution and by-laws and expressed in the addresses of the founders are as follows:

To give those laboratories which can be classed under a broad interpretation of "ethical" as applied to dental laboratories, an opportunity to express their ideals and raise the standards of laboratory practice; to standardize laboratory methods and technic.

Membership in the society is to be limited to the owners and executives of laboratories which are conducted along ethical lines.

At the meetings, papers will be read on dental and mechanical subjects pertinent to laboratory work and technic, and clinics will also be held.

It would seem that the time is fast approaching if not already here when the various dental societies should take such laboratory owners into their organizations as associate or full membership, for there is much that they can contribute to the advance of dentistry if given the opportunity.

Cooperation of Public Health Workers

IN A STUDY OF PUBLIC HEALTH EDUCATION AND PUBLICITY

The Department of Surveys and Exhibits, Russell Sage Foundation, is making a study in social welfare education and publicity, with special reference to some phases of education in the health field.

The immediate studies deal with the qualifications, training and responsibilities of those who do the work; with the materials for education and publicity as supplied by national or state agencies or produced by local agencies; with the methods of all three groups in making use of these materials.

COOPERATION INVITED

Any or all of the following will be of considerable value:

First, outlines of "programs" or plans for publicity or education; detailed descriptions of publicity projects or of plans for using various forms of publicity and the committee organization for "putting over" an idea or item of information.

Second, samples of all forms of publicity; press stories; photographs and other material.

Third, names and dates of particular events, as "health days," "health weeks," or other campaigns, and any significant public meetings, or meetings for the discussion of publicity methods.

Fourth, names of persons who are doing particularly good work in health education or publicity through the use of graphic material, printed matter, making addresses, organizing meetings, making use of an automatic stereopticon or other equipment, object lessons in speaking, or otherwise.

Fifth, reports of observations on how people react to education material of any kind or to any practical teaching methods.

Sixth, Comments and criticisms on the effectiveness and suitability of educational or publicity material put out by national or state organizations in the health field.

Seventh, unsolved problems of those who are doing health education or publicity work, as budgets, supervision of their work, opportunities for training, or whatever may affect efficiency or satisfaction in their work.

Eighth, a place on all of your mailing lists for the following address: E. G. Routzahn 130 East 22 Street, New York City.

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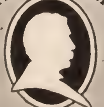

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NEWS and OPINIONS

CONDUCTED BY G. E. HARTER

The gods certainly are good to me these days. Many opportunities to be of help to many of my good friends in the dental profession are coming my way, the latest being an invitation to visit the Arkansas convention at Little Rock, the week of May 16, and fill a place on the program.

The trip down was made under ideal conditions of time and weather, the natural beauties of spring were at their best, and the many courtesies received make the entire experience one long to be remembered.

On Monday the subject presented was "The Dentist and His Dollar." The close attention of the audience and many expressions of satisfaction made to me are convincing evidence that the message delivered was timely and reached its mark. On Tuesday my subject was "Professional Efficiency —Educational and Physical," and was even better received than that of Monday. So many favorable comments were made, and such an unanimous invitation to come again next year was extended that any man would have been convinced that he really had a message for the dental profession.

I am especially indebted to Drs. Miley, retiring president, C. U. Mayfield, president-elect, G. C. Jernigan, convention manager, F. P. Travis, H. P. Hopkins, and many others, for unusual and much-appreciated courtesies.

The convention ran through the entire week, being devoted almost entirely to three post-graduate courses conducted by Dr. E. B. Owen, St. Louis, on Full Denture Prosthesis; Dr. Arthur E. Smith, Chicago, on Oral Surgery-Exondontia Anesthesia; and Dr. Norman B. Nesbett, Boston, on Partial Denture Prosthesis and Removable Bridge Work. Considering business conditions in Arkansas, the attendance was all that could be expected, while members of the classes were prompt in attendance and displayed the most commendable interest.

If ever there were a pair of "live wires" yoked together for the accomplishment of a purpose Drs. Miley and Jernigan are such a pair. It will give me much pleasure to meet all of the Arkansas dentists again; and, if called upon, shall do my best to have something for them worth while.

On Tuesday night I left for Nashville, where the greatest program in the history of the Tennessee Society was under way. Owing to lack of coordination between railroads, the journey of about 450 miles consumed about twenty-four hours, arriving late Wednesday evening. Mr. Mark Winchester, the very capable reporter for The Dental Summary, had been on the ground from the opening on Tuesday morning, and a full report of the meeting will appear in future issues. An important and very interesting part of the program was that having to do with child-welfare work in Tennessee during the past year, presented by Dr. A. G. Buckner, Maj. H. B. Butler, and Miss Verna Thornhill, the two latter making up a unit in the United States Board of Health Service which has been cooperating with the State Board of Health. While their work has not been confined to children, I consider that the most important part of it, since it has to do with the future citizenship of the state.

Among the national figures on the program were such eminent men as Dr. H. E. Frissell, Pittsburg, Pa., president of the National Dental Association; Dr. Boyd Gardner from Rochester, Minn.; Dr. E. R. B. LaDue, Chicago; Dr. C. C. Howard, Atlanta, Ga.; Dr. Wm. T. Arrington, Memphis, Tenn.; Dr. Thos. P. Hinman, Atlanta, and many others of like reputation.

The attendance included about ninety per cent. of the entire membership, the largest in its history. The meetings were well attended and great interest manifested.

Our good friend, Dr. George L. Powers, formerly of Paris, now practicing at Memphis, was chosen president, and the next meeting will be held in his city, Memphis. Judged by the impressions received during a visit of some five hours, Memphis may be called "Toledo of the Southwest," and a longer visit certainly is to be anticipated with pleasure.

One of my most pleasant experience since taking up work in the dental business was my visit by invitation to the Genessee county Dental Society at Flint, Mich., on May 4, when I had the pleasure and the honor of addressing the members of that organization on subjects connected with the financial phases of a dental practice. They are a lively "bunch," up at Flint; and, what is much more important, a unanimous lot of fellows, who work together like a well-trained team, personal jealousies and that sort of stuff being relegated so far to the rear that it is not observable to the visitor. The work that Dr. W. R. Davis and others are doing in the public school clinics is most commendable and not a little remarkable. I shall have much more to say on this subject in later issues. Organizations of dentists elsewhere who are interested and really want to know how to put over that sort of work, are advised to correspond with Dr. Davis. He surely can give them straight stuff. I wish to thank the dentists of Flint for their courtesies, and certainly hope to meet them all again.

Almost the sole cause, certainly the greatest cause, for the present stagnation in business and professional activity is the refusal of the so-called laboring classes, particularly the labor organizations, to accept their share of the burden of readjustment, and GET TO WORK. Unionists are refusing to accept even the most moderate reduction in wages, standing out for war-wages, despite the fact that they howl the loudest about the high cost of living, seeming to overlook the fact that so long as high wages are paid in all industries it is impossible to expect prices to fall. Men who were mighty glad to draw 40 to 60 cents an hour before the war, now refuse to work at a dollar an hour, demanding $1.25. The nation-wide strike of union printers rests upon nothing resembling justice or right. Prices for printed matter of all kinds are now ridiculously and almost prohibitively high; and along comes the demand for a 44-hour week, which means nothing at all except the privilege of drawing time-and-a half for Saturday afternoon, equalling an increase of around twenty-five per cent—which, of course, buyers of printing are expected to pay. Readers of *The Summary* may be interested in knowing that costs of publication have increased so enormously that we are now called upon to pay just about $1.000 per month more than a fair price; and most of this increase is due to unreasonable wages paid to so-called working men in the printing, paper and allied industries, who, by the way, have demanded and received one increase after another during the past three years.

It may not be generally known, but it is true, nevertheless, that the amount now paid in wages in many productive industries exceeds by a wide margin the total cost of products, including labor, material, administration and selling, before the war. Freight rates are a conspicious example. One illustration will suffice: The rate per hundred on lumber between two points before the war was 38 cents; today the labor-cost alone for that service is 40 cents, the total charge being around $1.00. And, in the meantime, the White Collar Brigade, the fixed-salary men, the income men, are suffering, that the commonest kind of labor may live luxuriously—or rather, hold out for wages that would enable them so to live if they got them, and show preference for loafing if they do not get them. I want my friends to get this thing clearly in their minds, and then use all their power and influence to bring about some show of ethics in the minds of those that come under their influence.

Do not lend the sanction of your influence to any form of class legislation. That is, legislation in favor if any one class against any one or all other classes. Legislation fixing maximum hours of labor; a minimum wage; both forms of class legislation. Suppose that dentists should petition Congress to pass a law declaring $5.00 to be the minimum fee, with a clause requiring every citizen of twenty to visit the dentist at least twice a year. What would happen to such a petition and why? It would never get a hearing, because there are only 45,000 dentists in the United States. If there were as many millions as there are thousands of dentists and if every dentist had a vote and used the privilege, such a law could be passed. Then the next step might be (provided there were not dental work enough to go around), to limit the working day to eight, or six, or five hours, so that every dentist might get a slice of the pie—and that would be class legislation; and that is precisely what laws fixing rates per hour, hours per day, and all such things that properly are matters of private contract, most assuredly are. If Congress can be induced to look after matters that most nearly concern the whole people, after repealing all class-laws once for all, it will have quite as much as such a body should be expected to do.

Dr. Thomas F. Ryan has written a book, "Teeth and Health," in which he declares that every medical student should be required to take a year in dentistry. At last, somebody has had the nerve to put the horse before the cart, instead of the wrong way 'round, as I have become accustomed to hearing these past thirteen years. Now if some big bug in the profession will only suggest a substitute for the word "Dentistry," with all its suffixes, affixes and derivatives, we shall begin to get ready to arrive somewhere. "Healthistry" conveys the idea, but it is not euphonious; wouldn't "catch on." A year or two ago a famous dentist fell all over me because I said that dentistry did more good, was more needed and was making more rapid progress than medicine and that if one or the other had to be wiped out I should prefer to see the practice of medicine abolished. He said he hoped that I ddn't mean it and that nobody would agree with me. But somebody did, and a good many somebodies do now, while I believe it more than ever. But to my mind, dentistry is only now beginning to think about getting ready to be born; and it is the dentistry that is coming that should and probably shall, take the place of medical practice. What I mean is, that the best that medicine gets an opportunity to do is merely reparative. There must be something to diagnose before there can be a diagnosis. On the other hand, dentistry can prevent the arrival of the necessity for a diagnosis: and when the dentist becomes the health-adviser of his patients, as well as the preserver and restorer of the masticating function, he will begin to realize his birthright, and come into his inheritance.

It is beginning to be suspected that a dental X-ray film is as dependable in identification as a finger-print. At least one attempted fraudulent collection of life-insurance has been defeated by it.

Cocain is cited as the cause of mental obscurity lasting for many hours, sometimes for days. Ellen Mahn, N. Y., was found wondering about the streets in a semi-dazed condition following the administration of cocain for extraction. If you happen to have any cocain in your cabinet, the best, the safest and the most humane thing you can do with it is to dump it down the sewer.

It isn't at all unusual these days to read reports of the activity of state and municipal dental clinics as printed in the lay press. Just let your mind wander backward eight or ten years, to the time when no self-respecting newspaper would print a word about dentistry except as advertising, paid for at regular rates.

The article recently printed in this magazine claiming the invention of wireless telegraphy for Dr. Mahlon Loomis, a dentist, is being widely copied by the lay press, both with and without credit. We care much less for the credit than for giving honor where honor is due, to an American rather than to an Italian.

Dr. H. K. Templeton, Covington, Tenn., has been appointed a member of the State board of examiners.

Allen county, Ind., of which Ft. Wayne is the county-seat is to have a portable clinic, the result of the activities of the Junior Red Cross. A county without a dental clinic will soon be as scarce as the jujube bird.

Suit has been brought against a Brooklyn, N. Y., dentist by the widow of a patient who leaped from a third-story window while under the influence of gas anesthetic.

The Royal College of Dental Surgeons, Toronto, has completed arrangements for a three to six-weeks postgraduate course to begin shortly, so planned as to make it possible for every dentist in Ontario to bring his knowledge and practice up to the last minute of advancement, at a merely nominal cost. Special courses also will be given to dentists who cannot visit the capital and form clubs for such instructions. Teachers will be sent from the college to serve such clubs.

Somebody writes for an opinion concerning speculation in German marks and in bonds of some of the principle cities in Hundom. Looks to me like a sure loser. I think and have thought for years that the present or some other so-called government over there will repudiate all debts, internal and external, wipe out the billions of paper marks with nothing behind them except the paper on which they are printed. and endeavor to make some sort of a new start, like a man discharged from bankruptcy, with no money and few friends. The temptation to take some such course increases with the speculative holdings of people outside of Germany. I regard a square game of American-made draw-poker as much safer than speculation in any such stuff. If you must gamble, sit in a game with your friends. Your chances will be even, at least; and the banker can hardly refuse to cash your chips when you are ready to quit.

The idea of a professional building for the use of dentists and medical men in Toledo, has been abandoned for the present. The high price of land, the exhorbitant demands of building-trades workmen, and the general unfavorable outlook are given as the reason for this action.

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Well, the Washington-state legal squabble has been settled with a vengeance. Judge Edward E. Cushman, of the U. S. District Court, has declared the state dental law inoperative, and that the powers given by it to the State Board are arbitrary and illegal. This means that any graduate of any reputable dental college may practice dentistry in the state of Washington without examination or license. A diploma still is required, but even that may be set aside if the fight goes on. Ethical dentists in other states may as well prepare for a fight. With such a decision as a precedent, the outsiders stand an excellent chance to win in every other state. Eternal vigilance must be the watch-word all along the line.

LATEST FROM WASHINGTON: State Attorney General points out that the U. S. Supreme Court has sustained the dental code of the state, and that, in spite of the decision of the district court, examinations must still be held and licenses secured before any dentist will be allowed to practice in the state. And there you are!

Just the same, I often have wondered how many practitioners of ten years' standing, could make a creditable showing before anv state board. I've asked some of them, and none of them feels entirely sure and safe about it.

Tell your children that they must never allow their teeth to ache. An aching tooth is a sick tooth and sick teeth NEVER get well, entirely. A tooth that has ached always is in danger of a relapse that may result in its death and ultimate loss. Educate the children; they will do the rest.

Any dentist honing for adventure? International News Service declares that a fortune awaits the dentist who will migrate to the Far North and swing his sign from an Esquimau igloo, provided he is willing to accept his fees in furs and walrus tusks, which, by the way, are worth a lot more just now than the prices asked for them up there. The Esquimau wife is esteemed according to the condition of her teeth, since her chief value to her husband lies in her ability to chew the skins of hides and pelts until they become soft and flexible. Any takers?

Licensed Washington and Oregon dentists may practice without restriction or examination in the Yukon country. A certificate of five years in practice is required of American dentists from other states. Canadian dentists may practice there at will, without license of any kind.

St. Louis dentists have joined the M. D.'s in their fight against a state law recently enacted which permits graduates of all medical and dental colleges to apply for licenses

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and practice in city hospitals, without examination, I suppose. The purpose of the fight is to submit the new law to a referendum vote, and insert the word "reputable" as applying to colleges.

No preliminary survey of children's teeth is necessary to establish the fact that 50 to 90% of them need dental aid and need it at once. No use wasting time in trying to establish that fact. It is as certain as the tides. For ten years every examination has confirmed it. Start with that fact as solidly established, and go after your school board and public-minded citizens until you succeed in arousing interest in the establishment of a local clinic. Then notice how respect for you and your profession increases; how everybody in town comes to know you and what you are doing. There are plenty of ways to increase your standing in the community; but this is the shortest and the easiest. Try it.

The Illinois State Dental Society which met at Peoria May 10, is now the largest dental organization in the world, numbering 2600, an increase of 780 over last year.

According to Drs. Paul R. Stillman and Arthur H. Merritt, of New York, at least 95% of all cases of pyorrhea are curable. What has become of the old forceps-treatment? Gone to join kataphoresis?

For the first time in the 53 years of its history, the New York State Dental Society met in New York city, May 11. It is stated that 3500 dentists were in attendance.

Novocain Dermatitis

Following is a letter from a good friend of The Summary on the subject. It may be of use to many readers.

Stephenson, Mich., May 18, 1921

Editor News and Opinion:

I note in April *Summary* you ask; "Ever hear of Novocain Dermatitis?" Last year, in February, I developed some sort of infection in the fingers of both hands and treated with my physician until July without much result. They appeared to be fairly good if I kept my hands away from saliva and local anesthetics. I was also particular about handling Formo Cresol. In July when my fingers were worst, all but two fingers being infected, to such an extent that the skin was lost as far as the first knuckles, I went to Chicago and consulted a specialist. The first question he asked me was if I used apostesine, or made my own solution of Novocain. I did not use the former, but made up my own solution. He told me that he had treated many cases of such nature as mine, due to Novocain poisoning.

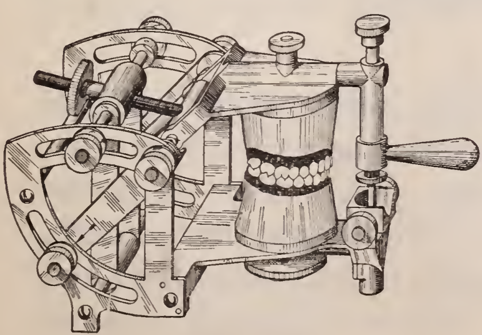
I was in Chicago ten days and came back home apparently cured, and in less than a week it broke out again. I took care of myself following the treatment prescribed and gave myself light X-ray treatments. In the fall my hands were the best until this spring when they again bothered me but not to such an extent that I had to stop work, for by using surgeons' gloves I have been able to work. The past two weeks my hands have been fine and with the exception of two places now I am free of any trouble.

Trusting this may be of some help to you, I remain.

Very truly yours,
H. L. MEAD.

In thirteen years of constant use, not one case of this or any trouble has been reported as following the use of Nontoxo, due no doubt, to the presence of antiseptics in the solution. "It is better to be safe than sorry."

At Little Rock I spoke of this matter, and was shown a case on the hand of a dentist in attendance at the convention. It appeared like a subcutaneous eruption, almost scarlet in color, very itchy and annoy-



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MANY sensitive women who wear artificial dentures suffer mental anguish when they meet their friends socially. They fear to smile! They know the falseness of their *unnatural* teeth. They do not wish to display a deformity that has robbed them of one of Nature's greatest aids to Health and Beauty.

Stop a moment—suppose ***your*** wife or mother wore the sort of teeth that made you think of "china" every time you saw them. Would you seriously consider the cost if you were shown artificial teeth which harmonize in form with face forms and which simulate natural teeth in character?

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Well, ***you know*** that Trubyte teeth will effect a decided improvement in practically all cases, and if used ***first*** will give freedom to smiles which would otherwise be smothered or suppressed.

We are all peculiar, but we all respond to much the same impulses and rare is the patient who fails to choose Trubyte teeth when she is given the opportunity of comparison, and is told the advantages which they possess over all other artificial teeth—advantages that are known and appreciated all over the world.

Your ability to transform an evidence of senility into a harmonious part of your patient's individuality through the use of Trubyte teeth, will result not only in ***smiles*** of satisfaction, but in more tangible rewards.

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ing. The trouble seems confined to such operators as make up their own novocain solutions. Shall be glad to hear more about it.

Since writing the above, Dr. J. F. Lang, Woodville, Ohio, called at this office and exhibited his hands, which were in the recovery stage, after nearly three weeks' absence from the office. Dr. Lang says that the first symptom was a most intense itching, which no remedy seemed to allay for any length of time. Circulation in the epidermis seemed entirely cut off, the skin becoming thick, rough and cracked, finally peeling off. Unfortunately two of Dr. Lang's fingers became infected, one of them requiring to be lanced.

So far as we now know, the wearing of rubber gloves is the only protection. As times goes on, the matter will become generally understood and some preventive devised.

Illinois—State

Peoria, May 12—At the closing session of the fifty-seventh annual convention of the Illinois State Dental Society this afternoon, the following officers were elected:

President, Frederick B. Noyes, Chicago; president-elect, D. E. F. Hazel, Springfield; vice-president, H. R. Daniels, Peoria; secretary, Arthur G. Smith, Peoria.

The following executive council will serve three years: Group 1, Dr. Frank A. Wells, Belvedere; group 2, Dr. A. E. Converse, Springfield; group 3, Dr. George E. Knapp and Dr. I. B. Clendenen, both of Chicago.

Lifting out of "wisdom teeth" so impacted that dentists in general practice had tried in vain to budge them is the special work of Dr. George B. Winter, exodonist, St. Louis.

In his clinic before the convention here the doctor took less than a minute to lift out impacted mandibular third molars which would be commonly called "wisdom teeth" crowded by adjoining teeth.

The cases handled were those on which dentists had failed with all ordinary methods.

Dr. Winter uses no forceps. With specially made instruments, and after careful x-ray examinations, he lifts the troublesome teeth out in a few seconds and with little apparent effort. Like a slight-of-hand performer he smiles at his audience with the job completed in an incredibly short time. "He is a wizard," was the comment of his fellow dentists as they watched the operations of the specialist.

One case handled in Dr. Winters clinic had been given up by two dentists and the surgeon completed extraction in fifty seconds.

Go Slow With the Forceps

A Sane and Sound Conservation Advised at the New York Meeting.

Brooklyn, May 15—The harm alleged to be done by bad teeth has been over emphasized. At least this seemed to be the opinion of four professional men, two representing the dental profession. The delegates appeared to be so interested in dental diseases as related to systematic diseases that the convention manager decided to stage a symposium for the benefit of those interested.

Several hundred dentists gathered Friday night, and listened to a quartet of prominent medical personages give their versions of the relation of dental diseases to systemic ailments. The speakers were Dr. Sydney R. Miller, of Baltimore, a member of Johns Hokins University and president of the American Congress of Internal Medicine; Dr. Robert Garfeld Snyder, assistant professor of Clinical Medicine at Columbia University and assistant attending physician at City Hospital; Dr. Clarence J. Grieves, of Baltimore, chief of the dental clinic at Johns Hopkins, and Dr. Leroy M. S. Minor, of Boston assistant professor of Oral Surgery at Harvard University.

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"Go slow with the forceps" was the admonition of Dr. Grieves, and the other physicians agree with him.

It remained for Dr. Snyder to launch the heaviest attack on those who believe the extraction of teeth is the panacea for all bodily ills. The Columbia professor did not mince any words in characterizing teeth extraction for systemic ills as a fad.

"I wish to enter a mild protest for the medical profession and the public in general against the too radical removal of teeth on the ground that they are the cause of systemic diseases," said Dr. Snyder. "We have enough isms, cults and fads. Some years ago there was a fad that called for an operation as a cure for mental disturbances in women. Then there was the appendicitis fad, during which many healthy appendixes were removed. There followed the craze for the extraction of adenoids and tonsils. For some years past it has been the belief of many that local infection was the cause of many ills. The pendulum has swung far in that direction, but recently it has begun to swing back.

"Some of the ardent supporters of the theory that dental diseases cause systemic ills and that the latter can be cured by wholesale extraction, usually pick out a prize case or two and publish these without making mention of their failures. In a majority of cases the removal of dental infection does not cure other ills. Any infectious disease might be the result of the infection of the tooth, but how big a factor it is is difficult to prove.

"I think the consensus of opinion would show not more than 10 per cent. of the systemic diseases benefited by the extraction of teeth. I think this a liberal estimate An estimate much nearer correct would be 5 per cent."

The dental and medical men agreed that thousands and thousands of teeth already had been sacrificed to what Dr. Synder called a "fad." Temporary relief seems to have been afforded by these extractions, but in a short time the old aliment returned as virulent as ever. Attention was called by a Brooklyn physician to George "Lefty" Tyler, a ball player, who had all his teeth removed in order to cure an ailment which affected his throwing arm.

Dr. Miller sounded "a note of warning to those leaning unwisely," toward the belief that all systemic ills could be attributed to dental troubles and cured by the extraction of teeth. "Who is there that can say a dental condition is primary or secondary to systemic ills? No one," said the Baltimorean.

Dr. Minor stated that while astonishing results are admitted to have been achieved when dental infection has been removed, "many things remain to be explained before the theory can be accepted."

The Harvard pedagogue continued that while it could be granted defective teeth cause systemic diseases, it could be just as true that systemic ills might cause dental troubles.

"The tissues of the mouth are susceptible to the ills of other parts of the body." said Dr. Minor, citing cases where diseases of the body caused pyorrhea. He called attention to the case of a girl of high school age. She was anemic and had poor teeth. "Who shall say that the poor condition of the teeth caused her anemia or the anemia caused the infection of her teeth? I think the odds favor the later belief," said the speaker.

Dr. Minor referred to a patient who could not sleep because of pain in his mouth. He had all his teeth removed, still there was no relief. He went to a physician and was discovered to be a victim of incipient diabetes. Proper medical attention cured him.

New York—State

New York, May 14—Officers were elected and important business transacted during the sessions of the annual convention of the Dental Society of the State of New York which adjourned at noon today. This is the first time the society has held its annual meeting in this city, although it is fifty-three years old.

B. S. Hert, of Rochester, was elected president; Albert W. Twiggar, of Ossining, vice-president; A. P. Burlhart, of Auburn, secretary, and G. H. Butler, of Syracuse, treasurer.

Missouri—State

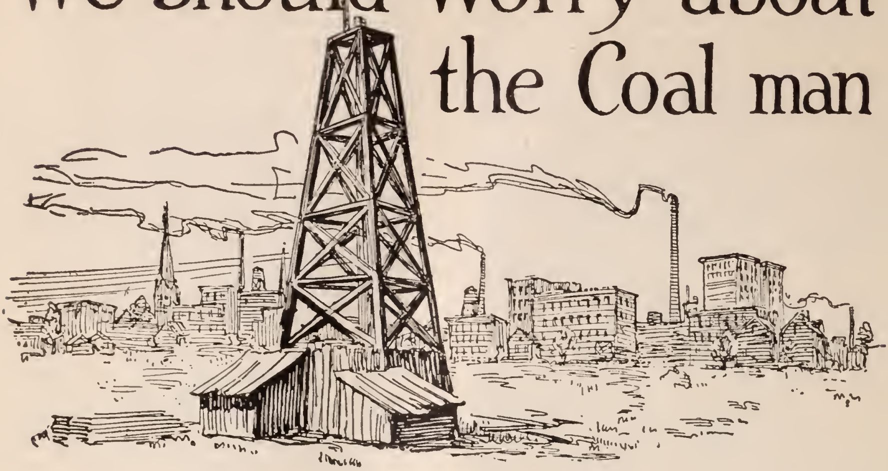
Springfield, April 28—A tri-state meeting of the dental associations of Missouri, Kansas and Oklahoma will be held in Kansas City in 1922, a decision to this effect having been reached at a business session of the Missouri State Dental association yesterday afternoon, following an invitation from officers of the Oklahoma and Kansas organizations. The business meeting was the final session of a three-day convention.

Dr. H. C. Pollock was reelected secretary and Dr. J. F. McClellan of Moberly was reelected treasurer. Edward M. Hall of Kansas City was elected president and R. H. McCrum was named vice-president at a session Tuesday afternoon.

Indiana—13th District

South Bend, April 21—The Thirteenth District Dental Society was opened with a lecture and address by Dr. C. L. Mason, "Removable Bridge Work, with Some Prac-

We should worry about the Coal man



WHEN we decided to gamble $6,000 against a gas well underneath our plant they looked at us and tapped their heads significantly. 'At 500 feet we thought that they were right, but at 800 we knew that they were not. *Today we have a gas well on our own property delivering us 65,000 cubic feet of gas per day.*

WILLIAMS

No more heat, light, or power bills!

A gas engine driving a dynamo furnishes our light and power!

We should worry about coal miner's strikes

Today we can refine your scrap or smelt your sweeps cheaper than any other firm in the world because heat and power is the biggest item of expense in smelting and refining.

At a given price we can put *more quality* into dental gold products than any other firm and---*we are doing it!*

Most dealers will gladly send us your scrap gold, sweeps, etc. if you ask them. The returns they make to you, whether in WILLIAMS gold products or cash, will be accompanied by our certified refining memo.

Specify WILLIAMS when ordering gold from your dealer!

The Williams Gold Refining Co.
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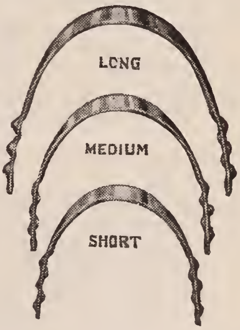


Williams Ready - made Lingual Bars—for shape, weight and strength.

DENTAL GOLDS

tical Cases and Suggestions for Impression Taking." and the members from Mishawaka, Nappanee, Goshen, Elkhart and South Bend expressed much pleasure at the thoroughness of the talk.

The old officers, president T. J. Walsh of South Bend; vice-president G. F. Hitchcock, Plymouth; secretary Ivan E. Smith, Mishawaka, and treasurer W. L. Milstead, Mishawaka, presided over the meeting. A second lecture was given in the afternoon by Dr. R. E. MacBoyle of Chicago on "New Abutment Pieces in Fixed Bridge Work for Both Anterior and Posterior Vital Teeth."

After a dinner at 6 o'clock the evening lecture was held and Dr. Carl D. Lucas of Indianapolis spoke on "External Alveolar Resection."

The arrangement committee included Drs. F. L. Axtell, J. A. Stoeckley, T. J. Walsh of South Bend and Ivan E. Smith of Mishawaka.

The new officers, who will be installed in July, are Drs. W. O. Vallette, Goshen, president; Vaughn L. Kennedy, Elkhart, secretary; George Menges, Elkhart, treasurer, and G. F. Hitchcock, Plymouth, vice-president.

DEATHS

At Hamilton, N. Y., April 4. Dr. Wallace L. Bardeen, aged 55.

At Michigan City, Ind., March 31, Dr. Robert A. Marr, aged 60. He had practiced there 30 years.

At Cincinnati (No. Norwood) Ohio, April 9, Dr. Shotwell Harrison Roff, aged about 60.

At London, Ky., April 10, Dr. M. K. Pennington, aged 46.

At Everett, (Boston) Mass., April 20, Dr. Ernest L. Johnson, aged 55.

At Oakland, Calif., April 14, Dr. James Lafayette Cogswell, aged 90. He was the founder of the National Society Sons of the American Revolution in the West. He had practiced in San Francisco 40 years.

At Los Angeles, Calif., April 26, the body of Dr. Joseph Durant was found underneath an overturned auto. He had been killed by three bullets fired into his body. A companion, Myron McCauley, a scenario writer was found lying near. He had a bullet through his heart. No method or cause is assigned.

At Rochester, N. Y., April 22, Dr. Thomas E. Nesbit, aged 60.

At Chicago, May 2, Dr. Thomas J. Rowland, aged 40, died from the effects of a bullet wound supposedly inflicted by his wife.

At Philadelphia, May 2, Dr. Robert A. Taylor, aged 42.

At Crescent City, Fla., April 21, Dr. Meyer acobs, of Oswego, N. Y., aged 70.

At Chicago, April 28. Dr. J. Newton Roe, formerly secretary to the president of Valparaiso University.

At Utica, N. Y., May 2, Dr. Samuel H. Jones, aged 60.

At Spokane, Wash., May 2, Dr. A. H. Gundlach, aged about 50.

At Girard, Ill., May 5, Dr. Asaph H. Barnes, aged 81.

At Huntington, N. Y., May 7, Dr. James P. Kelly, of Manhattan.

May 3—Dr. John W. Forbes, a member of the faculty of Tufts Dental School from his graduation in 1892 until five years ago, died at his home on Townsend street, Roxbury, yesterday. For several years he had practiced dentistry in Boston. He was born in Taunton, 1860.

At Savannah, Ga., March 4, Dr. Alonzo G. Bouton, age 73.

Dr. Bouton was for twenty-one years on the Georgia state examining board of dentists. He was president of the Georgia State Dental Society and first president of the Savannah First District Dental Society. He was awarded a certificate of honorable fellowship by the Georgia State Dental Association, an honor conferred on a very few of the profession.

At Chicago, May 5, Dr. A. H. Barnes, aged about 80.

At Wichita, Kans., May 4, Dr. W. L. Reed, aged 65.

At Lewistown, Pa., May 6, Dr. L. H. Derr, aged 47.

At Bristol, Ind., April 19, Dr. Frank Hampshire, formerly of Lafayette, aged 70.

At Grand Rapids, Mich., May 12, Dr. William F. Leslie.

At Malden, Mass., May 13, Dr. Carey R. Chester, aged 57.

At Pittsburg, Pa., May 15, Dr. T. C. Van Kirk, aged 60.

At Modesta, Calif., May 16, Dr. A. J. Hiniker, aged about 50. He was interested in aeronautics, having resigned and built an airship called the "Skylark."

"Surely you can tell the age of people by their teeth. But you don't have to. They tell you themselves and with their ages they tell their family histories and their ambitions and their hopes and fears." That's what Miss Marv McArdle, surgical nurse and anesthetist of Seattle, Wash., says of her work. 'It's about half diplomacy," says she. "You treat their brains as well as their teeth, for you always hurt the patient who knows he will be hurt and you seldom wound so much as the feelings of the patient who believes he's safe in your chair as he is on the parlor sofa." Miss McArdle is said to be one of the city's most expert anesthetists. She has been at her present position two years and since 1914 a Seattle trained nurse. Her training was in Vancouver, B. C., General Hospital and in other Canadian cities.

Dental Unit In St Louis Hospital

St. Louis, April 24—The special municipal appropriation committee of the Tuberculosis Society of St. Louis, of which Dr. S. T. Lipsitz is chairman, has reported an urgent recommendation for a dental laboratory and a resident dentist at Koch Hospital the municipal tuberculoisis sanatorium, and an appropriation of $1000 to cover the cost of the laboratory and equipment. A bill was introduced in the Board of Alderman last week to create a section of dentistry within the Department of Public Welfare with the appointment of a dentist at each of the city institutions.

The recommendation of Dr. Lipsitz's committee, which was indorsed by the Board of Directors of the Tuberculosis Society, is based on a recent survey made by Dr. J. P. Harpper, dean of the St. Louis University College of Dentistry. Dr. Harper states that there are 143 patients at Koch Hospital who need dental care. Many general practice dentists object to attending tuberculous persons, Dr. Harper states.

Good teeth are an important factor in the treatment for tubercolsis, because of the question of diet.

A resident dentist would be available for the care of children and would supplement the work of the School Board at the open-air school at Koch Hospital. A daily session of regular grade school work is conducted in a pavilion for children patients.

Kentucky—State

Louisville, Ky., April 14—Members of the Kentucky State Dental Association in session here to-day elected officers for the ensuing year. E. B. Hardin, of Madisonville, was elected president; E. C. Hume, Louisville, re-elected to be secretary, and R. L. Statt, Mt. Sterling, treasurer. Drs. E. T. Marcialett, Louisville, P. H. Williams, Ashland, and Gray Clark, Russelville, were chosen as members of the Board of Trustees.

State Dental Board Organizes at Toledo

The state dental board recently named by Governor Davis held its organization meeting here recently, and named Dr. J. F. McDonagh of Cleveland, president, and Dr. Ray R. Smith 207 East State street, Columbus, secretary.

Other members of the board are A. H. Breitenwischer, Toledo; C. H. Burmeister, Cincinnati, and S. E. McKim, Jr., Marietta.

The board decided to hold its practical examinations as follows: May 23, 24 and 25, Ohio College, Cincinnati; June 6, 7 and 8, Western Reserve university, Cleveland; June 9, 10 and 11, Ohio State university dental college, Columbus.

The regular practical and theoretical examinations are to be held the week of June 27 at Columbus.

Classified Advertisements under this heading, $2.00 each for 60 words or less; additional space, 2 cents per word, single insertion; three insertions or more special rate on application.

FOR SALE—Harvard mechanical lift disk base chair (fair condition). Ritter new model folding bracket; alternating current engine (new); Wall bracket and table (new); Weber cuspidor (new); Sterilizer (new); Steel white enamel cabinet. $240.00 for the lot, or will sell separately. For information, inquire The Ransom & Randolph Co., Detroit, Mich.

FOR SALE—Dental office and practice. In Iowa town of about 100,000 population. Tributary to the largest and richest agriculture country in the United States. Complete Ritter X-Ray equipment; four private operating rooms and laboratory. Will invoice about $10,000. Business running around $30,000 a year. Excellent location. Business has been well and cleanly advertised. Good business to be taken over by a partnership. Price, $20,000; at least one-half cash. Address, The Dental Summary.

FOR SALE—Four-chair dental office complete with X-ray. All equipment practically new. Complete in every respect for a general practitioner. Business last year $28,000.00. Located in city of 200,000 in northern Ohio. Reason for selling; will specialize in pyorrhea and prophylaxis in business district. 630C

FOR SALE—Dental practice and equipment of Dr. T. H. Whiteside, Youngstown, Ohio. This practice is selected from wealthy patrons, and requires a high class operator. Write Dr. Whiteside, in care of The Youngstown Dental Depot.

FOR SALE—Cash practice and up-to-date equipment in Detroit. Prominent and busy corner—three mile circle. Weber unit, Ritter chair, Pelton and Crane electric switch board. Has been established as dental office for over ten years. Address The Ransom and Randolph Co., Detroit, Mich 620C

FOR SALE—Old established semi-advertising practice in thrifty town of thirty thousand. Will sell part, or all equipment at invoice. One Favorite Columbia chair, one Morris chair, one over-head Ritter engine, Rogers' X-ray, Crocker gold mills, etc. Rent very reasonable. Retiring. Dr. Hill, Clarksburg, W. Va.

WANTED—Back numbers of The Dental Summary including Ohio State Dental Journal from Vol. 1 No. 1 to date. Anyone having back numbers of The Summary that they wish to dispose of will find this an opportunity that dodes not come often. Let us know what you have. Address H. F. in care of Dental Summary.

THE next meeting of the State Board of dental Examiners will be held in Fa rgo, beginning at nine o'clock Tuesday morning, July 12. All applications must be filed with the Secretary at east ten days before the exomination. For further information write W. E. Hocking, Devils Lake, N. D.

SAL HEPATICA

MATERIALLY AIDS
Local Treatment in
PYORRHEA
Bristol-Myers Co.
New York

April 16, 1921.

This will announce to you the organization of the Memphis Prosthodontia Club.

The purposes of this organization are (1) to provide elementary technical instruction for junior laboratory men and dentists' office assistants, (2) to provide advanced instruction in prosthetic technic for dentists and experienced dental laboratory workers, (3) to bring about a more effective co-operation, generally, between the dental surgeon and the dental laboratory.

These objects will be attained by means of night classes, by clinical demonstrations, and by meetings to be held at some convenient location which will be a permanent home and a gathering place for the members of the Club.

The senior laboratory men of Memphis have generously agreed to furnish part of the equipment for the laboratory of the Club. The rest of the expense of the organization will be defrayed by the membership fees, and possibly by tuition fees paid by the students of the classes maintained by the Club.

Any dentist, any experienced laboratory man who is heart and soul for Better Dentistry is invited to become a member of the Memphis Prosthodontia Club. We believe the benefits of this organization will be incalculable, and we earnestly hope that the progressive example of Memphis will be followed by other cities throughout the country.

Indiana—Whitley County

Churubusco, April 14—The Whitley Counley Dental Society held its annual election of officers at the office of the president, Dr. B. F. Slessman, Wednesday evening. All members of the society were present but one. The officers named are: Dr. F. B. Weaver, Churubusco, president; Dr. Elmer Grant, vice-president; Dr. C. L. Miller, South Whitley, secretary-treasurer.

Jackson, Mich., March 17—The following officers were elected for the year by the Second District Dental Society of Michigan: Prsident, J. T.Miller; vice-president, J. W. Lyons; secretary, C. H. Moyer; treasurer, Wm. C. Leggett.

A Short Cut

An ambitious young man went to a university professor and said: "Sir, I desire a course of training which will fit me to become the superintendent of a great railway system. How much will such a course cost, and how long will it take?"

"Young man," replied the professor, such a course would cost you twenty thousand dollars, and require twenty years of your time. But, on the other hand, by spending three hundred dollars of your money and three months of your time you may be elected to Congress. Once there you will feel yourself competent to direct not one but all the great railroad systems of our country."—New York Evening Post.

R & R Soluble Plaster

An Essentially Correct Impression Material

Soluble Plaster is offered in response to the demand of the modern dental specialist for an impression material possessing all of the good qualities of high-grade plaster, avoiding its defects, while presenting decidedly desirable advantages all its own.

Its most prominent feature and greatest advantage is that it readily disintegrates in boiling water, falling away from the cast or model, leaving it beautifully perfect, clean and unmarred.

Soluble Plaster is very easily handled, takes and holds every line, curve and minute detail of the mouth, sets quickly, fractures cleanly, sharply, and with ease.

Packed in 4 ½ lb. Cans
Price $1.25 at Toledo

The Ransom & Randolph Company
TOLEDO, O. U. S. A.
CLEVELAND COLUMBUS AKRON FLINT DETROIT GRAND RAPIDS

REGULAR CONTRIBUTIONS

THE DENTAL SUMMARY
THE MAGAZINE THAT HELPS

Vol. XLI July 1921 No. 7

TAPING THE TEETH, AN IMPORTANT PROPHYLACTIC MEASURE

BY JOHN P. CARMICHAEL, D.D.S., MILWAUKEE, WIS.

How many dentists place importance upon taping the teeth, or take into consideration the necessity of frequent taping?

If we consider the cause of inflammation, taping the teeth in dental prophylaxis is without question of more importance than any other measure.

We know that a well developed case of pyorrhea is accompanied by chronic inflammation. But "how" and "why" did it reach this advanced stage? Many are not willing to admit that no case presents pyorrhea unless the disease has reached a virulent form, a condition met with following many stages of gum infection, during the course of its development.

It is a proven scientific principle that all inflammation has origin in bacterial activity, and we cannot have bacterial activity without a culture medium in which the germs propagate and secrete toxins. The putrescent matter beneath the gums provides an ideal culture medium.

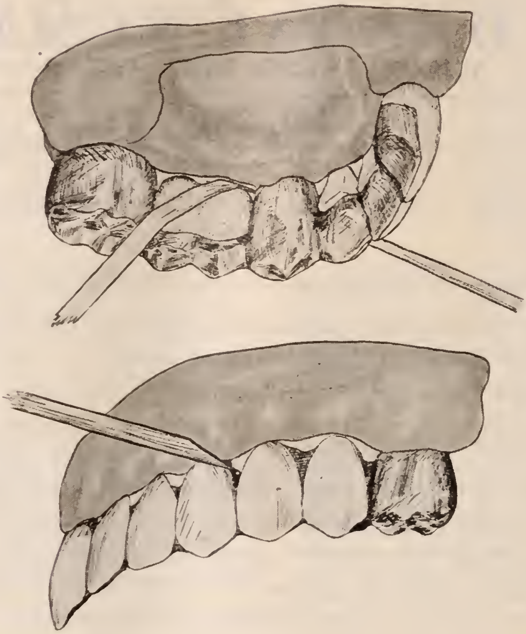
We all know that in every case where chronic inflammation has advanced to the pus-forming stage, there are quantities of putrescent matter always present beneath the loose inflamed gums covering the root surface. Although we are thorough in our root curettment and leave a polished root surface, we have yet to deal with a swollen, infected gum that is constantly pouring out serous exudates that are deposited upon the roots of the teeth, a condition to be constantly dealt with until all the inflammation has subsided.

In a previous article, I have referred to the value of the use of a surgical dressing to allay the inflammatory stage and to guard against re-infection. However, the importance of taping is apparent as a mechanical means of removing the putrescent matter previous to applying the dressing.

Nature is the only great healer, and real prophylaxis means assisting Nature in warding off disease. Let us forget "cure-all" remedies and confine ourselves to the common-sense principle of removing the cause. Clean out the infectious matter and keep it out. Do not allow your patient to rub a sticky-gelatinous tooth paste under the loose margins of the gum, and then expect to cure the inflammation, for in this event you would only be supplying a fresh culture medium.

USES FOR THE TAPE

In many cases it is necessary to "Clean Up" a mouth before beginning instrumentation. This may require two or three days' preliminary treatment; the proper use of the tape will be found to be of valuable service in this connection.

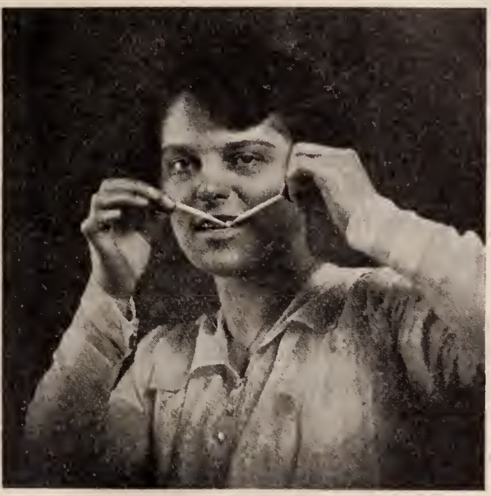


After brushing the teeth with a soluble organic tooth powder, direct the patient to use the waxed ends of the tape, sliding it through the spaces between every tooth and as far as possible beneath the loose gum, and on both sides of the root. The waxed ends are soft and yield enough to follow half way around the root before it will appear from beneath the gum, thus pushing out large quantities of putrescent matter which cannot possibly be removed by means of brushing. This is easily accomplished by the patient and can be done twice daily without the slightest irritation to the inflamed tissue. Following this, advise the use of a mild, non-astringent mouth wash. Boracetine answers the purpose.

Within two or three days the inflammatory conditions will have subsided to a degree that instrumentation or extraction may be undertaken without danger of reinfection. After curettment and after extractions the gums are packed for two or three days with surgical dressing.

For a few days after instrumentation, taping is not required, for during this time the gums are packed with surgical dressing. However, as soon as the healing process is well under way, the daily use of the tape will be found to be of great service in wiping out the serous exudates that cling to the root surface beneath the loose gums. This condition when present retards the healing process, and is largely responsible for the aggravated red gum margins, often found very stubborn to deal with.

When curettment is thoroughly done there is no other one adjunct of greater assistance to the dentist in his prophylactic and pyorrhea treatments than to have the patient well instructed so that he can co-operate by frequent use of the tape. He should be taught that it cannot be done too often, and that the results will be all the better if the taping is done after every meal.



The waxed ends make it possible for the patient to use the tape in keeping properly constructed, fixed bridge work as clean as the natural teeth themselves.

A dentist cannot expect satisfactory results from his prophylactic and pyorrhea work unless he has a perfect understanding with the patient to the end that he will follow fully all the instructions for the home care of the teeth. While this factor is one of the most important to consider if we expect to avoid re-occurrence of the trouble, it is too commonly overlooked. For it must be remembered that the progressive developments of the infection is due primarily to the original failure of care, and too often reliance is placed upon preparations that do more harm than good.

"HARNESSED VITALITY"

BY MILTON D. NEFF, D. D. S., CLEVELAND, OHIO

BEING AN EXPOSITION OF THE TRUE VALUE OF ELECTRICITY IN THE HUMAN BODY WITH DEMONSTRATION OF THE VIOLET RAY HIGH FREQUENCY CURRENT IN DENTISTRY

(Written for THE DENTAL SUMMARY)

VITALITY IS ELECTRICITY

WHEN the soul leaves the human body the switch is thrown off and the physical is out of communication with the divine. Electricity is the greatest physical force in the universe. It exists in many forms with which we are already familiar and must be operating in ways that we know not of. For man to have discovered its utility so recently and considering its tremendous field of service at present it is inconceivable to try to comprehend its ultimate scope of usefulness.

A wild horse is a dangerous animal in civilized quarters, but trained he has proven man's best servant. Electricity uncontrolled is capable of the most extreme destruction, but harnessed it moves the world. Like the swift flowing current of a river, it may carry ruin in its path, but walled in or insulated it will do the work of ten thousand horse power, without a whip. Like a river passing over a falls, the current is broken up into a spray which is vitalizing but harmless; it has the same actual qualities as the original current, but none of its objectionable features.

An enlightened consciousness of the value of electricity can not allow of antipathy toward it. Antipathy is born of ignorance sired by indifference. The Dental Fraternity cannot afford to be indifferent to the true vitalizing powers of the Violet Ray of High Frequency Current, which is the spray of electricity, since its work is so intimately related to the vital forces of mankind.

Disease is stagnation in one form or another. High frequency stimulates the circulation, dispels the stagnation, thereby promoting health.

All forms of dental disorder and pain arise from disease or malposition. In all cases High Frequency affords relief and aids recovery. Ozone is generated by this form of electricity and is carried into the body by the vehicle of the electric current, thereby supplying the specific revitalizing material directly to the affected part. This acts as an andoyne to the inflamed nerves and a food to impoverished cell tissue of whatever sort affected. Applied in this method, it is a positive germicide.

Chemical experimentation bears out the practical tests. Bacteria are largely carbon and this is combustible in the presence of oxygen. But instead of awaiting the roundabout method of having the part cured by permitting the germs to be marshalled into the blood stream by leucocytes and carried to the lungs for combustion, incidentally taking the chance of "germanic invaders" getting the upper hand and causing death, we are enabled to provide the chemical equivalent directly to the seat of disease.

Oxygen enters into combination with the carbon within the very cells and thereby destroys their harmfulness. At the same time the stimulated circulation is enabled to carry off the exudates of the inflammation, and there is substituted pure ozone, which is the actual *predigested nutriment* which any cell of the body needs for food. The function of the lymphatics is accelerated. The supplies brought up by the blood stream are aided in entering the cells. New cell formations are effected and in truth the same application which does one, does all—*electricity harnessed is life.*

Medicaments are carried on the electric current into that part to be treated just as positively as is the ozone. This permits of utilizing a local anaesthetic electrically on a highly inflamed part where it is desired to do some dental operation.

The scope of usefulness of the High Frequency Violet Rays is unlimited, in fact it is indicated in all painful dental conditions, as will be suggested in the clinic to follow.

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765 Rose Bldg.

THE FUNDAMENTAL FUNCTION OF THE DENTAL COLLEGE

BY A. ALFRED NELSON, D.D.S., DETROIT, MICH.

(Written for THE DENTAL SUMMARY)

THIS article has been prompted by the reading of Dr. H. E. Friesell's article entitled, "Progress in Dental Education," in the May issue of THE DENTAL SUMMARY. In this article I find on page 383, Table 5, entitled, "Suggested Standard Schedule for Four Year Course in Dentistry, with Preliminary Requirements of Fifteen High-School Units," or in other words the curriculum advocated by the Dental Educational Council, in which it is noted that Dental Anatomy is allotted the magnificent total of 112 hours work in the Freshman year only, nothing being allotted in the Sophomore, Junior and Senior years, with the exception of sixteen hours of Comparative Dental Anatomy in the Junior year!

Since dental education is the constantly recurrent topic of the day, it is of interest to consider what studies are or should be the mainstay to a degree.

A well articulated course in Dental Anatomy covering a period of four years as the background of a body of studies leading to a degree of D.D.S. or D.M.D., outweighs all other considerations to the same extent that physical and perspective anatomy is the background to a sculptor's course.

While much has been done in matters of dental education and the standardization of curriculæ, it still is a question whether we are not in a rather primitive state of affairs regarding advancement and improvement.

This then, I believe, is the fundamental function of the dental college: To endow its students with a comprehensive view of the whole field of dentistry, studied from the anatomic and functional points of view.

Every dental college should present a complete dental anatomy course, distributed over the four years of college life, or at least localized in the last two or three years instead of in the first, as at present. One of the stock objections against the prolonged study of dental anatomy is the fact that little progress has been made in this field since the day of that great investigator, G. V. Black—i.e., progress in method of teaching. This is a gross error but, without entering into the pro and con of the question, it is evident from the history of all human institutions, that to make progress and even to insure holding what already has been gained, we must have leaders. As Dr. Mayo, then president of the American Medical Association, once said, "The next great advancement in the medical world must come from the Dental Profession. Are they equal to the task?" or words to that effect. Leadership is developed by special training; and hence, it is natural if dental thought and science are to influence the world in the matter of better health in the future, we must have leaders of dental thought, especially trained for this all-important task.

Bearing in mind what has been stated above, dental thought scientifically systematized finds its expression in dental anatomy and not in phases of dental technic, and thus it follows that these future leaders must be well grounded in this branch of our art. Here, then, is justification for making a thorough and as far as possible within the time limit allowed, complete course of dental anatomy the mainstay in a dental college course.

This presentation has for its object the purpose of arousing interest in dental anatomy. I have attempted to drive home what I consider certain fundamental principles with the hope that this article will fall into the hands of those who guide the destinies of the profession as regards the undergraduates in colleges. The other motive deals with the practitioner in the hope that he will take a more profound interest in this important subject, and through this interest and study he will not be a "blind man groping for a black object in a dark room," as is the present condition of things in most of our reconstructive work, due to our lack of knowledge of anatomy of the parts involved.

213 Chalmers Bldg.

STRUCTURAL CHANGES WITHIN THE PULP CANALS OF TEETH FOLLOWING PARTIAL PULP REMOVAL. (PULPOTOMY)

BY WALLACE CLYDE DAVIS, B.SC., M.D., D.D.S., LINCOLN, NEB.

(Continued from page 492, June DENTAL SUMMARY)

History of Case 141. Mr. X. First right superior bicuspid. Several teeth including this one were extracted on account of Pyorrhea. No history from dentist. However, patient described a clear case of pressure anesthesia and immediate root filling. The condition of the pulp at the time of crowning the tooth was not entirely clear as patient stated he remembered only that it pained him when he got some food in the tooth. Date of radiogram and extraction, May 10, 1920. Serial sections were made of the root from the apex to the cement with which the crown was

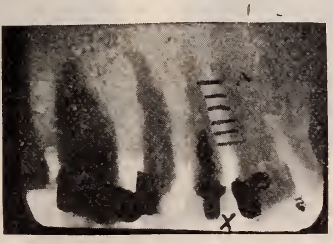


Fig. 13

Fig. 13 (Case 141).—Roentgenogram of first right superior bicuspid taken just before extraction. Figs. 37 to 59 inclusive are microphotographs of six slides of this case.

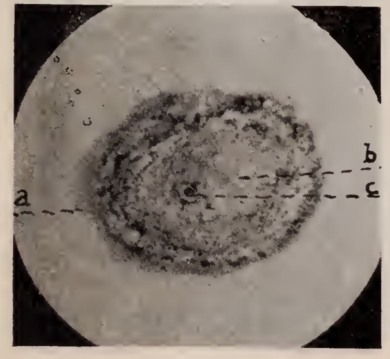


Fig. 14

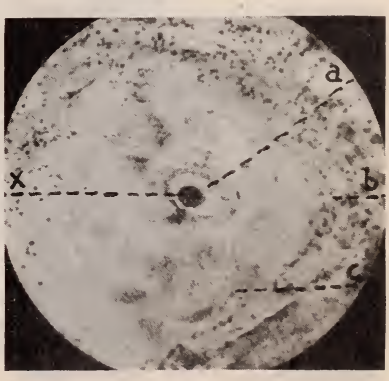


Fig. 15

Fig. 14 (Case 141).—Section A, at the apex of root. (a) Peridental membrane. (b) Cementum. (c) Vital pulp tissue. Eosin stain. (Magnification 20 X.)

Fig. 15 (Case 141).—Section A.—(a) New cemental tissue. (b) Cementum. (c) Dentin and cementum mixed. (Magnification 50 X.)

set. Six sections are shown with Section A, beginning at the apex. This case illustrates that class of cases in which a small portion of the pulp remains vital and probably active in the deposit of osteoid tissue at the time of extraction. The pulp tissue is represented in the following sections by the round dark spot in the center, which is rendered dark by the eosin stain.

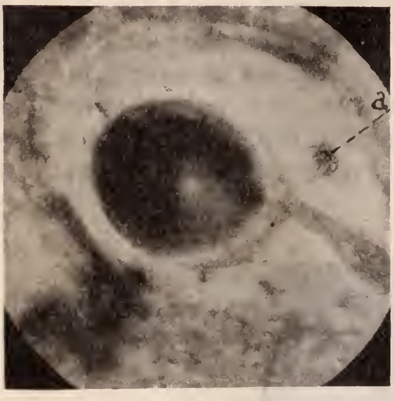


Fig. 16

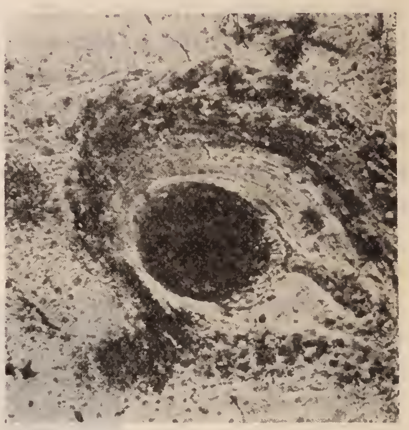


Fig. 17

Fig. 16 (Case 141).—Section A. Higher power of Fig. 15 at X. (a) Single lacuna in the body of the newly formed cemental tissue in the mouth of the foramen. This root is one of the few found with only one foramen. (Magnification 430 X.)

Fig. 17 (Case 141).—Section A. Micro-projection. (Magnification 320 X.)

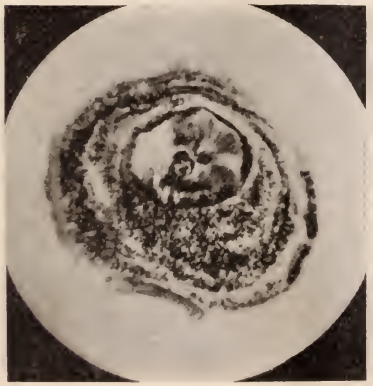


Fig. 18

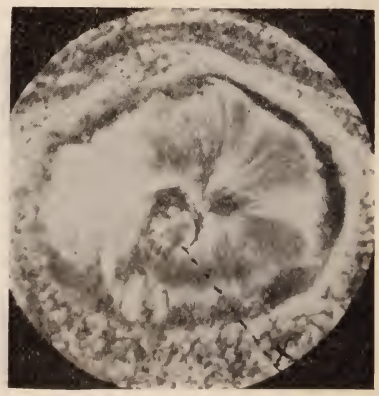


Fig. 19

Fig. 18 (Case 141).—Section B. (Magnification 20 X.)

Fig. 19 (Case 141).—Section B. (Magnification 50 X.)

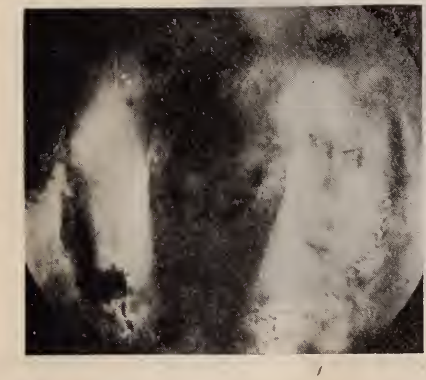


Fig. 20

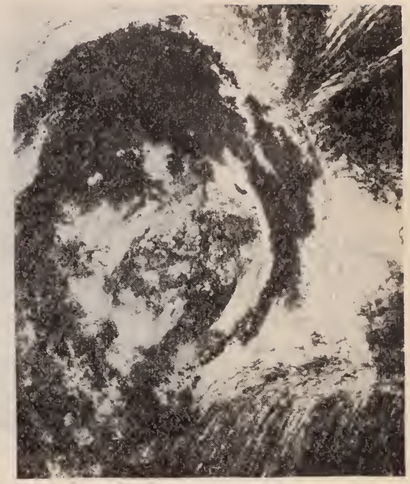


Fig. 21

Fig. 20 (Case 141).—Section B. Higher power of Fig. 19 at X. (Magnification 430 X.)
Fig. 21 (Case 141).—Section B. Micro-projection of Fig. 19 at X. (Magnification 320 X.)

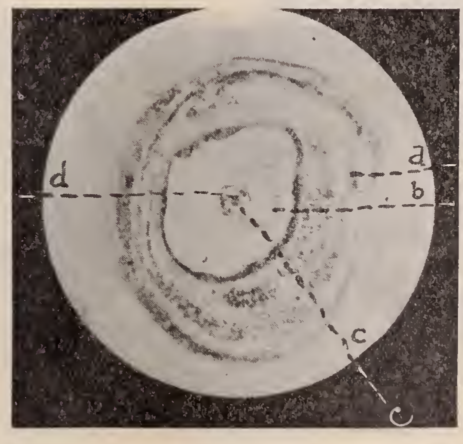


Fig. 22

Fig. 22 (Case 141).—Section C. (a) Cementum. (b) Dentin. (c) Vital pulp tissue. (d) Cemental tissue. (Magnification 20 X.)

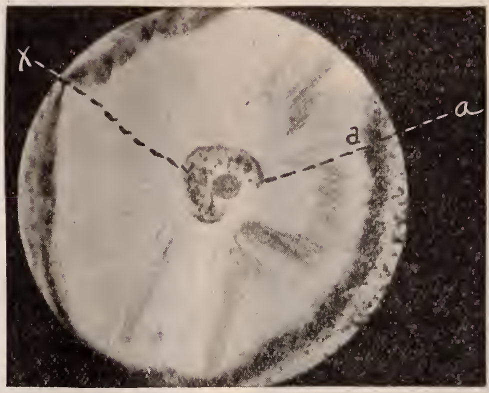


Fig. 23

Fig. 23 (Case 141).—Section C. (a) That which was once the pulp canal. (Magnification 50 X.)

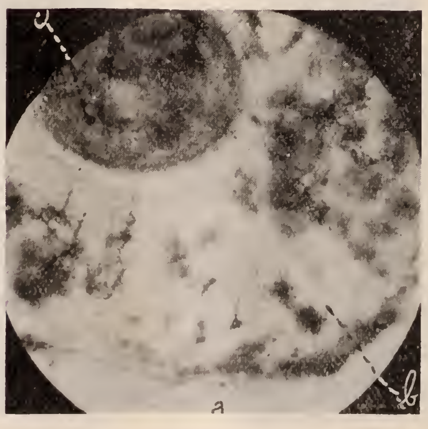


Fig. 24

Fig. 24 (Case 141).—Section C. Higher power of Fig. 23 at X. (a) Dentin. (b) Cemental tissue. (c) Pulp tissue. (Magnification 430 X.)

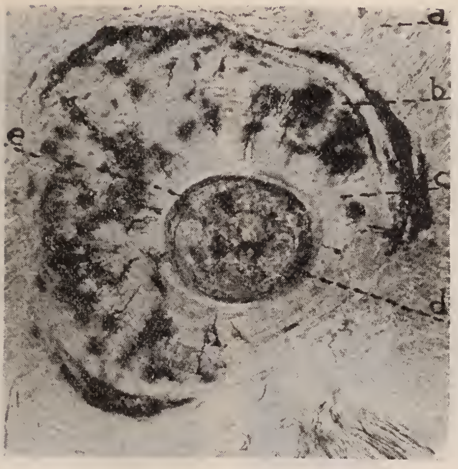


Fig. 25

Fig. 25 (Case 141).—Section C. Higher power micro-projection of Fig. 23 at X. (a) Dentin. (b) Cemental tissue with lacunae and canaliculi. (c) Note the lamellae. (d) Pulp tissue. (e) Membrane.. (Magnification 320 X.)

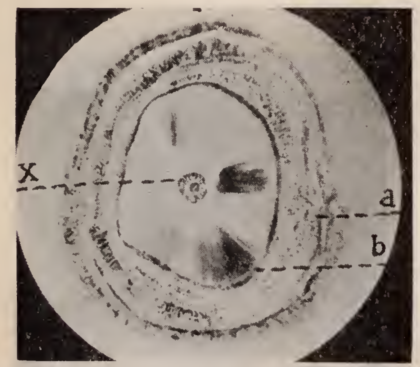


Fig. 26

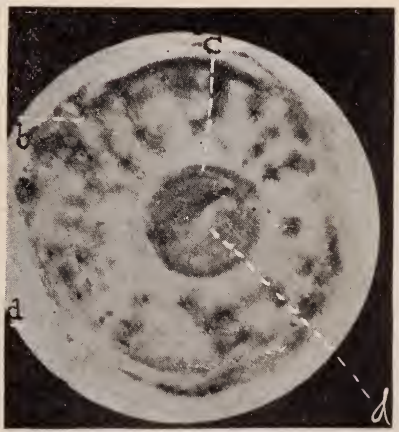
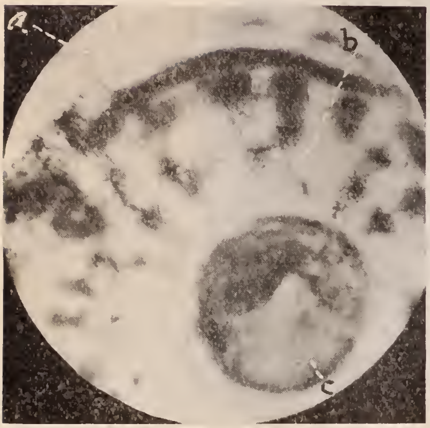


Fig. 27

Fig. 26 (Case 141).—Section D. (a) Cementum. (b) Dentin showing fibrilla dentalis. (Magnification 20 X.)

Fig. 27 (Case 141).—Section D. (a) Dentin. (b) Cemental tissue nearly filling the canal. (c) Pulp-tissue. (d) Pulp-tissue torn by the shrinking process as outlined in the technic given. (Magnification 50 X.)



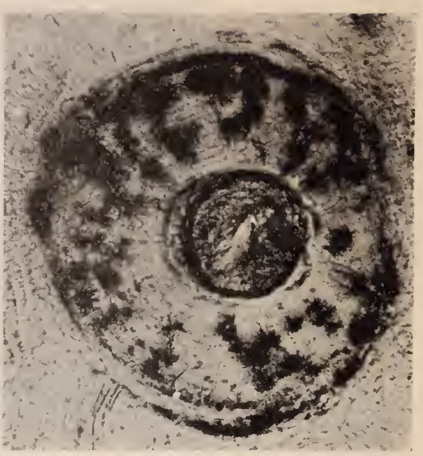
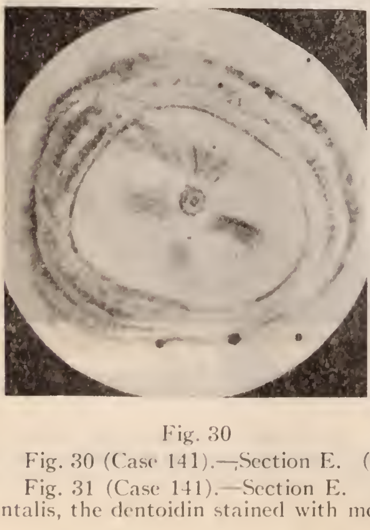


Fig. 28

Fig. 29

Fig. 28 (Case 141).—Section D. Higher power of Fig. 27. (a) Dentin. (b) Pulp canal nearly filled with cemental tissue showing many lacunae with canaliculi. (c) Pulp-tissue. Eosin stain. (Magnification 430 X.)

Fig. 29 (Case 141).—Section D. Higher power micro-projection of Fig. 27. (a) Dentin. (b) Pulp canal nearly filled with cemental tissue. (c) Pulp tissue. (d) Lacunae with canaliculi. (e) Note the lamellae. (f) Membrane repsonsible for the formation of the osteoid and cemental tissue. Eosin stain. (Magnification 320 X.)



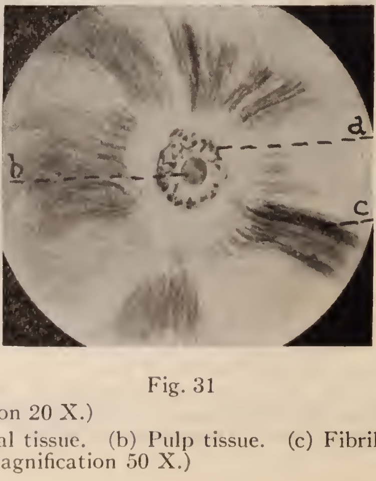


Fig. 30

Fig. 31

Fig. 30 (Case 141).—Section E. (Magnification 20 X.)

Fig. 31 (Case 141).—Section E. (a) Cemental tissue. (b) Pulp tissue. (c) Fibrilla dentalis, the dentoidin stained with mercury. (Magnification 50 X.)

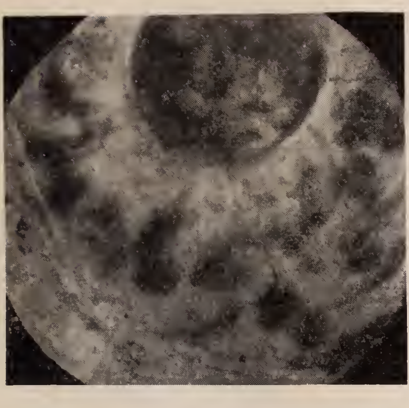


Fig. 32

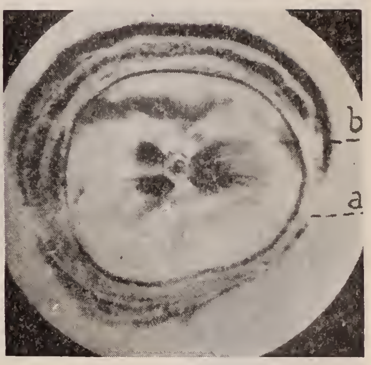


Fig. 33

Fig. 32 (Case 141).—Section E. Higher power of Fig. 31. (Magnification 430 X.)

Fig. 33 (Case 141).—Section F. (Magnification 20 X.) (a) Primary cementum. (Note the near absence of the lacunae.) (b) Secondary or pathological cementum, characterized by the abundance of the lacunae. All teeth which have been subjected to the force of mastication or the inflammatory processes incident to retarded eruption are possessed of reparative or pathological cementum, an additional example of tissue metaplasia. Again teeth which have come into occlusion soon after eruption, or have an abundance of hyperplastic cementum, are most uniformly possessed of multi-foramina.

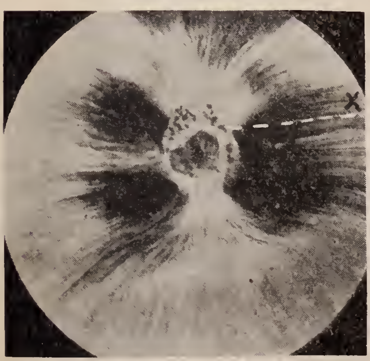


Fig. 34

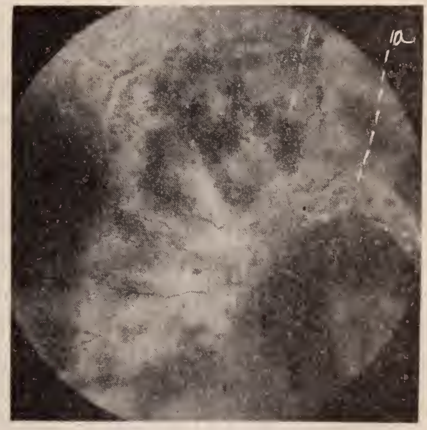


Fig. 35

Fig. 34 (Case 141).—Section F. (Magnification 50 X.)

Fig. 35 (Case 141).—Section F. Higher power of Figure 34 at X. Tissue at (a) not determined. It is possible that a resorption is taking place here at the time of extraction. (Magnification 430 X.)

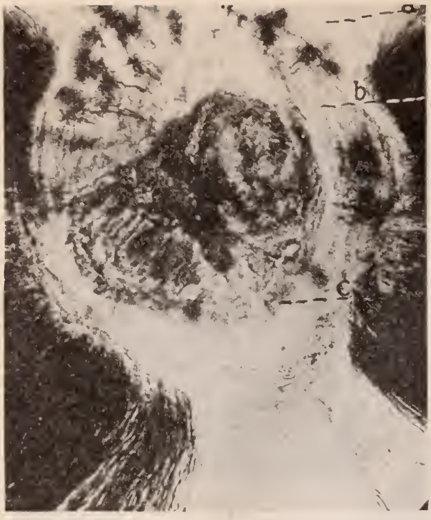


Fig. 36

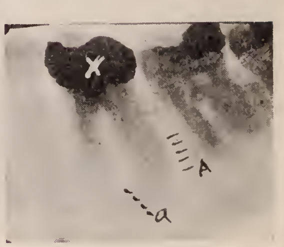


Fig. 37

Fig. 36 (Case 141).—Section F. Higher power micro-projection of Fig. 34. (a) Reabsorption of dentin has taken place before the deposit of osteoid tissue (written of by Mr. Caush, 6). (b) Not determined. Probably resorption of the previously built cemental tissue was taking place at the time of extraction. (c) Probably a secondary deposit of osteoid tissue.

Fig. 37 (Case 157).—Roentgenogram taken before extraction which was sixteen years after operation of pulpotomy on distal root. (a) Note granuloma attached. The mesial root was treated for putrescence at the same time, evidently without success. Twenty microphotographs of five slides of the distal root are shown in Figs. 38 to 51 inclusive.

(To be continued.)

IMPRESSION FOR FULL LOWER DENTURE

BY C. H. WOOLGAR, M.D., D.D.S., MAGDALENA, NEW MEXICO

(Written for THE DENTAL SUMMARY)

THE technic of the lower impression is somewhat different from that of the upper impression as presented in the April number of THE SUMMARY. The technic as given for the upper impression I have used for over a year with the best of results; but the same technic for the lower has not been satisfactory. Change in the technic, as here presented, has proved very satisfactory. Of course, it has not been used for a great length of time and just what per cent of lower dentures will have adhesion, I do not know; but the technic produces dentures with adhesion. The technic is as follows:

Select a tray a little larger than the lower jaw, that extends distally back to the muscles beyond where the third molars were, and down on to the edge of the attachment of the labial, buccal and lingual muscles to the jaw; soften some impression compound, take an impression of the lower jaw, have patient raise the tongue, work it from side to side, close the mouth, suck the lips and cheeks in. This will give quite an accurate impression, and a good idea where the muscles are attached to the jaw. Chill the compound and remove from the mouth. It is not necessary that this be an absolutely accurate impression. Make a cast with impression plaster. Very little time will be required for the cast to harden. When it is removed from the impression, with the blow pipe, heat a lower piece of Graft's base plate, adapt it to the cast, pressing it down tightly along the labial, buccal and lingual edges corresponding to where the muscles attach to the jaw and while warm trim off excess of base plate with a pair of scissors and smooth edge with a vulcanite file. Remove base plate from cast, place in the mouth; the lower edge of the base plate should extend as low as the attachment of the muscles to the jaw and back on the muscles, beyond where the third molars were. With the two fingers of the left hand hold the base plate firmly on the jaw, while the index finger of the right hand is passed along the labial, buccal and lingual edges of the base plate, pressing down on the mucous membrane if space is found between the edge of the base plate and jaw, the base plate is removed, the cast is scraped corresponding to where adaptation was poor on the jaw. Place the base plate on the cast and re-adapt it to the cast. This is repeated until no perceptible space is found between base plate and jaw. The base plate will not as a rule adhere to the lower jaw as the upper base plate will. Hold the base plate firmly on the jaw and have the patient move the muscles of the jaw. If there is pain, there is some place where the base plate presses too hard. It should be relieved. The base plate is removed from the mouth, dried and slightly warmed, at the same time warm a large piece of compound that does not soften at low temperature and is very tough, about one-half inch thick and long enough to extend along the entire length of the base plate to which it is firmly attached, covering well all the upper surface; this makes the base plate strong and rigid.

This base plate we have constructed, we shall use for a tray. Take some compound that softens at a low temperature or some wax compound made of equal parts of bee's wax and maroon wax that S. S. W. teeth come on, black wax that Trubyte teeth come on, warm tray slightly; place in tray softened wax; take impression of the jaw, using quite a little force in adapting impression to the jaw, remove tray, cut away surplus wax along the edge of the tray, warm the surface of the wax over an alcohol or small gas jet, retake the impression until a satisfactory impression is obtained. A satisfactory impression will require quite a little force to remove from the jaw. The last impression should be chilled with cold water before removing from the jaw. The cast should be made at once of Spence's plaster. When the cast is removed from the impression, before it is handled it should be coated with a good grade of liquid silex. When flasking, the denture should be in the upper half of the flask. The cast about level with upper edge of lower half of flask, the rubber is packed into upper half of flask. Just before closing flask for the last time the cast is given a second coating of liquid silex and excess washed away with water. While the cast is wet the flask is closed. Tin foil must not be used if the best results are desired.

THE TREND OF THOUGHT IN INDIANA

BY EARL BROOKS, D. D. S., NOBLESVILLE, IND.

(Written for The Dental Summary)

The building of a program for a Dental Society presents several questions that must be taken into consideration if a program is to be a success. First, it must be attractive enough to insure a large attendance, and that usually means that it is necessary to have men of national reputation booked to appear on your program. Yet one must not overlook the fact that it is advisable to have men from our own state to appear on the program as they are frequently as instructive as foreign talent; besides they should have recognition and development in the matter of writing papers.

The desires of the membership should be recognized as far as possible, yet it is advisable to have a balanced program and it is always policy to place some of the fundamental subjects on program as well as those that are for the time being the popular subjects.

In ascertaining the desires of the membership in Indiana this year, we passed out at one of the sessions the following ballot:—

SUGGESTIVE VOTE FOR NEXT YEAR'S PROGRAM

The committee cannot guarantee that the subjects selected by the majority will be secured for next year's program, but an effort will be made to please the membership. Vote the figure 1 in your first choice, the figure 2 in your second choice, and the figure 3 for third choice.

☐ Cavity Preparation
☐ Denture Prosthesis
☐ Removable Bridgework
☐ Gold Inlays
☐ Amalgam
☐ X-Rays
☐ Focal Infection
☐ Periodontoclasia
☐ General Anesthesia
☐ Crown and Bridges Fixed
☐ Porcelain Work
☐ Oral Hygiene
☐ Pathology and Bacterology
☐ Pediadontia
☐ Orthodontia
☐ Block Anesthesia
☐ Oral Surgery
☐ Business
☐ Gold Foil
☐ Sterilization
☐ Root Canal Work
☐ Ionization
☐ Organization
☐ Peridental Excision

Sign if you care to. ....

It so happened that at the time the ballot was taken there was a very small attendance in the assembly room, yet the tabulated results is probably a fair representation of the trend of thought in Indiana.

In figuring the rating, we considered a first choice vote three times as valuable as a third choice and a second choice twice as valuable as a third choice vote and added these three together which gave us the rating, as follows:

Subject	First Choice	Second Choice	Third Choice	Rate
Cavity Preparation	12	4	4	48
Denture Prosthesis	44	13	9	167
Removable Bridgework	45	24	15	198
Gold Inlays	4	5	7	29
Amalgam	10	12	4	58
X-Rays	10	11	10	32
Focal Infection	17	13	11	98
Periodontoclasia	7	7	1	32
General Anesthesia	5	9	9	42
Crown and Bridges Fixed	10	17	20	84
Porcelain Work	7	10	6	47
Oral Hygiene	2	12	5	35
Pathology and Bacteriology	3	5	5	24
Pediadontia	1	3	2	11
Orthodontia	3	4	4	21
Block Anesthesia	11	22	13	90
Oral Surgery	11	11	21	76
Business	8	15	26	80
Gold Foil	1	4	10	21
Sterilization	0	5	2	12
Root Canal Work	7	10	22	63
Ionization	0	2	4	8
Organization	1	1	3	8
Peridental Excision	0	0	3	3

In the hope that this might be of some benefit to some one else in the arrangement of a program the writer was asked to make this brief report.

TECHNICAL EDUCATION IN THE DENTAL LABORATORY SERVICE*

BY A LABORATORY MAN

GEO. L. ROTH, MEMPHIS, TENN.

IN SUBMITTING this plan for the education of Dental Technicians, in response to the request with which you honored me at a recent meeting, I hope that it will be regarded as a germ of a plan rather than one that is completely developed and ready for instant realization. If it seems to be somewhat prematurely, and perhaps superficially elaborated in certain places, please remember that the purpose was merely to supply illustrations of the general idea in the form of details that, no doubt, could be considerably improved in the course of further discussion. This is particularly the case with the practical examination schedule, and the schedules for the grading of Dental Mechanics. These have been set forth in detail so that we can have some conception, if only for the purposes of discussion, of what really should be the extent of the practical accomplishments of a Dental Technician, and of a Class A, B, or C, Dental Mechanic.

Still granting that many of these details are susceptible of modification, and that the whole plan has the touch of the amateur about it, there are certain factors in it that are *absolutely fundamental.* You must make room in your midst for an educated class of Dental Technicians to take charge of the Prosthetic Laboratory Service that has become an integral part of modern dental practice. You must bestow degrees of some sort or other to certify that these men have received this education. You must create institutions or departments in your Colleges to give these men their education, and perfect their laboratory technique. You must provide for their receiving sufficient technical experience before they go to school to enable them to benefit by the advanced training they will receive there. And since that primary technical experience in the manipulation of materials can only be gained through having to do that work to earn a livelihood, you must resort to the system of apprenticeship. You must provide for contracts for hire which will ensure these men receiving comprehensive practical instruction. You must provide for the supervision of the fulfilment of these contracts by your local organizations, and finally you must provide for the regulation of the whole process of education by the supreme educational authorities of the dental profession. These are the conditions you cannot escape. They are the basic elements of my scheme, and I am certain that no solution of the problem will ever be permanently satisfactory which does not embody them.

---

*Read before the Memphis Dental Society, June 16th, 1921.

I.

THE SCOPE OF THE VOCATION OF DENTAL TECHNICIAN

"Dental Technician" is the term to be applied to a person who is performing all but the surgical operations involved in the construction and adjustment of an Artificial Denture, a Dental Restoration, or any other remedial appliance required by the Dental Surgeon.

II.

THE CERTIFICATION OF A DENTAL TECHNICIAN

That a man is a Dental Technician should be attested by the possession of a diploma granted by a duly authorized teaching and examining body, after his having received technical instruction by that body for a specified period of time, and having passed a Final Examination to test his competence. The degree of Certified Dental Technician should be conferred upon any person who fulfills these conditions.

III.

AUTHORIZATION OF THE TEACHING AND EXAMINING BODY

The Dental Educational Council of America should prescribe:

(1) The minimum standards to be observed in the final examination for the degree of Certified Dental Technician.

(2) The minimum requirements for the curriculum of any institution bestowing the degree of Certified Dental Technician.

(3) The minimum standards for (a) entrance requirements to such an institution for this course of instruction; (b) the qualifications of the members of the teaching body; (c) the equipment for the purpose of giving this course of instruction.

IV.

CURRICULUM

The course of instruction should occupy two years of not less than 2,000 hours per year, of which at least 1,000 hours should be devoted to advanced Prosthetic procedure, including the technic of impression taking. The rest of the time should be occupied with lectures and laboratory work in the other subjects in which the student is to be examined. The scope of the curriculum proposed can be gathered from the section on the Final Examination.

V.

ENTRANCE REQUIREMENTS

Academic requirements—

No one should be admitted as a student by the teaching body who has not graduated from High School, or who does not possess equivalent credits as recognized by the Dental Educational Council of America.

Technical requirements—

No one should be admitted as a student who has not served a five years' apprenticeship to a Certified Dental Technician, his Preceptor, and who cannot produce his Indentures of Apprenticeship, endorsed upon completion by his Preceptor or Preceptors, together with certificates from an authorized Local Examining Board attesting that he has been examined and has successively passed the tests for a Class C, a Class B, and a Class A Dental Mechanic.

VI.

PERSONNEL OF THE TEACHING AND EXAMINING BODY

The personnel of the teaching and examining body should include

(a) Dental Surgeons, for the lectures upon Physiology, Dental Anatomy, etc;

(b) Certified Dental Technicians who, in the earlier stages of the institution, are also Dental Surgeons, for the clinical work in Prosthetics;

(c) For the lectures and laboratory work in Chemistry, Physics, Metallurgy, etc., University graduates who are experts in these lines whether they do or do not possess Dental degrees.

VII.

FINAL EXAMINATION FOR THE DEGREE OF CERTIFIED DENTAL TECHNICIAN

Each student should be required—

(1) To pass a written examination in elementary Physiology, Pathology, Dental Anatomy, Dental Surgery, Chemistry, Physics, and Metallurgy, to the extent that these sciences bear upon Prosthetic Dentistry.

(2) To plan a Partial Denture upon consideration of study models of an actual case, and the Diagnosis of a Dental Surgeon specifying

what particular types of device or appliance are contra-indicated; to explain his plan in a short paper, and to describe in detail the impression and the bench technic involved in its construction.

(3) To take impressions of the mouth, and a bite, for
  (a) An edentulous case, or
  (b) A partial plate, and a Removable Bridge with clasp retention.

(4) To carry out the laboratory technic for—
  (I) The casting or swaging of a metal base for a full upper or lower denture; and the completion of a full upper and lower denture in vulcanite with anatomical articulation.
  (II) The construction of clasps and gold framework or base for a partial plate, and the completion of a partial plate in gold or vulcanite.
  (III) The construction of a Fixed Bridge, including the abutments by the indirect method, and of a Removable Bridge using any type of retention that may be required by the examiners.
  (IV) The construction of a porcelain inlay and veneer crown.
  (V) The construction of an obturator and some type of splint for a fractured jaw.

The student should be permitted to select any of the above practical tests of his technical skill.

(5) To submit to some practical test in elementary machine work.

VIII.

APPRENTICESHIP

The Apprenticeship recognized by the Dental Educational Council of America as one of the Technical Entrance Requirements to any institution granting the degree of Certified Dental Technician should be an apprenticeship of not less than five years under a Preceptor who must be a Certified Dental Technician, whether he does or does not possess any other dental degree.

IX.

THE INDENTURES OF APPRENTICESHIP

The Indentures of Apprenticeship recognized by the Dental Educational Council as evidence of apprenticeship would be, in substance, a Contract between the Apprentice and his Preceptor, in which the former binds himself to serve his Preceptor faithfully for five years in consideration of being paid according to a progressive scale of remuneration and of receiving such instruction in Prosthetic Art as will fit him to present himself for periodical examination by the Local Examining Board for the purpose of obtaining certificates grading him as a Class C, a Class B, and a Class A Dental Mechanic. Both parties would also agree to abide by the decision of the Local Board as arbitrator in any dispute as to the fulfilment of the terms of the Contract.

X.

NON-FULFILLMENT OF THE CONTRACT

In case of non-fulfillment of the Contract by the Apprentice or the Preceptor the facts should be submitted to the Local Board. If it should appear that the Apprentice is incapable of the faithful service demanded of him by the Indentures, then the Preceptor should be permitted to dismiss him and cancel the Indentures. If it should appear that the Preceptor has failed to give the required instruction or to pay the stipulated wages, then the Preceptor shall be required to surrender the Indentures, having endorsed them for the length of time served by the Apprentice, and the latter shall be permitted by the Local Board to bind himself to another Preceptor for the unexpired term of his Apprenticeship. If it should appear that the instruction has been insufficient to enable the Apprentice to pass his examination for the Class C, the Class B or the Class A grade, then the Local Board should be empowered to require such extension of the unexpired term of the Apprenticeship as they judge to be necessary to enable the Apprentice to obtain his grades. If the death of the Preceptor should preclude his endorsement of the Indentures, then the endorsement by the Local Board should be accepted.

XI.

THE LOCAL EXAMINING BOARD

The Local Examining Board should be a Committee of the members of any County or City Dental Society appointed by the President, preference being given to members who are Certified Dental Technicians.

XII.

THE EXAMINATION OF DENTAL MECHANICS

The practical examinations by the Local Examining Board should be held at least twice a year. The purpose of these examinations being to determine the grade of the Apprentice, the following schedule of the practical requirements for a Class B, a Class C, and a Class A Dental Mechanic respectively will indicate the scope of the examination for each of these grades.

XIII.

CLASSIFICATION OF DENTAL MECHANICS

The details of the requirements for the different grades, as well as of the procedure for the examinations should be prescribed by the Dental Educational Council of America.

(1)

CLASS C DENTAL MECHANICS, ONE YEAR OF APPRENTICESHIP TO BE SERVED

A Mechanic of this Class should be capable of—

(a) Packing amalgam dies or pouring fusible metal dies into impressions for indirect work or for occlusion models.

(b) Pouring working casts in Plaster, investment material, "artificial stone" or cognate substances.
(c) Mounting working casts upon articulators.
(d) Investing edentulous or simple partial plates in vulcanite flasks, separating and preparing for packing.
(e) Investing simple assemblages, such as fixed bridges, partial plates, bars, clasps, etc., and preparing for soldering.
(f) Finishing and polishing vulcanite plates, or edentulous plates with metal bases, completed with vulcanite.
(g) Simple vulcanite repairs.
(h) Investing and casting a gold inlay, crown, or bridge unit.

(2)

CLASS B DENTAL MECHANICS, THREE YEARS OF APPRENTICESHIP TO BE SERVED

A Mechanic of this Class should be capable of—

(a) Preparing dies and counter-dies for a swaged full or partial gold plate.
(b) Investing and casting any section of a partial gold denture or a cast bridge.
(c) Setting wax bites upon working casts for partial plate or bridge.
(d) Flasking and packing any vulcanite denture, full or partial.
(e) Aligning and articulating, and completing a vulcanite partial denture.
(f) Duplicating or rebasing any vulcanite denture.
(g) Waxing up, investing and casting an aluminum base.
(h) Making or adjusting any palatal or lingual bar.
(i) Fitting plate or wire clasps to metal dies, and preparing for attachment to vulcanite.
(j) Aligning facings, backing up, assembling soldering, and finishing a simple fixed anterior bridge.

(3)

CLASS A DENTAL MECHANICS, FIVE YEARS OF APPRENTICESHIP TO BE SERVED

A Mechanic of this Class should be capable of—

(a) Swaging or casting a full gold base, or a partial gold base, and preparing for the attachment of the teeth with vulcanite.
(b) Completing a full denture in vulcanite, plain line articulation.
(c) Completing a partial denture in vulcanite, with a gold base or framework, such as a Lingual or Palatine bar, also with clasps.
(d) Completing gold partial plate, base, or framework swaged or cast, with any type of clasp, facings or bridge teeth soldered to base.
(e) The construction of a posterior gold shell crown upon a metal die.
(f) Carving, casting and fitting gold crown to metal die.
(g) The construction of a Richmond crown with any type of facing or bridge tooth.

(h) Alignment and articulation of facings or bridge teeth and the completion of any fixed bridge with solder.

(i) Aligning, articulating facings or bridge teeth, carving pontics in wax and casting, assembling castings and completing for simple fixed bridge.

(j) The construction of a clasp retention Removable Bridge.

(k) The construction of any type of splint for a fractured jaw.

(l) The construction of any type of simple orthodontia appliance.

XIV.

PROCEDURE FOR THE INITIATION OF THIS EDUCATIONAL PLAN

As soon as this plan, or one upon similar lines, is found to be acceptable to the National Dental Association, the Dental Educational Council of America should proceed to develop the details, and initiate the scheme in the following manner.

A

INITIAL CERTIFICATION OF DENTAL TECHNICIANS

An examination schedule should be drawn up along the lines indicated in Section VI of this plan. The Final Examination for the Degree of Certified Dental Technician, omitting (1) the written examination in Physiology, Dental Anatomy, Dental Surgery, Chemistry, Physics, and Metallurgy, (2) the practical examination in impression taking, and (3) the practical test in elementary machine work. This schedule which we will call the Examination for the Initial Certification of Dental Technicians should be published and every Dental College in the United States should prepare to examine applicants according to its provision.

For two years from the date of the publication of this schedule any person should be permitted to submit to this Examination for the Initial Certification of Dental Technicians who could satisfy these entrance requirements—

(1) Any Dental Surgeon who is a member of the National Dental Association and has been in practice five years previous to the date of examination, or,

(2) Any person who has been engaged in Prosthetic Laboratory work continuously for five years previous to the date of the examination, who has either been conducting a public dental laboratory, or has been employed by a public dental laboratory, or by a member of the National Dental Association for at least one year previous to the date of examination, and whose moral character is endorsed by the Dental Society of the City, or County in which he has been pursuing his livelihood.

In either case time spent in the Public Service under the Draft Law should not be taken into consideration.

All persons who satisfy these requirements and pass this Initial Examination with a grade by the examiners of not less than 85% shall receive the degree of Certified Dental Technician.

B

INDENTURES OF APPRENTICESHIP

The Dental Educational Council of America should draw up a form of Indenture to insure the technical instruction of Dental Mechanics. Only Indentures corresponding to this prescribed form should be accepted for the Technical Entrance Requirements to an institution conducting the course of education for Dental Technicians herein suggested.

C

THE LOCAL EXAMINING BOARD

The Dental Educational Council of America should draw up rules governing the appointment and duties of the Local Examining Boards, as well as Examination Schedules along the lines suggested in Section XIII of this plan for the grading of Dental Mechanics. These regulations and examination schedules should be published and communicated to Secretaries of every City and County Dental Society in the United States. These bodies should at once appoint the Boards and prepare for the examination and grading of Dental Mechanics.

D

THE INITIAL GRADING OF DENTAL MECHANICS

Any person who has satisfied the Entrance requirements for the Examination for the Initial Certification of Dental Technicians and has failed to obtain the degree, but has been graded not less than 60% by the examiners should receive a Certificate from the Local Examining Board for Dental Mechanics, making him a Class A Dental Mechanic.

Any person who has been continuously employed in doing Prosthetic Laboratory work for not less than three years previous to the publication of the Examination Schedules for Dental Mechanics by the Dental Educational Council, should be permitted to present himself for examination by the Local Board within two years of its appointment, and if he passes should receive a Certificate grading him as a Class B Dental Mechanic.

Any Class B Dental Mechanic under the above provision should be permitted to present himself for examination by the Local Board within two years of his obtaining his Class B Certificate. and if he passes should receive a certificate grading him as a Class A Dental Mechanic.

All Class A or Class B Certificates obtained under the above provisions, namely, within two years of the publication of the Examination Schedules for Dental Mechanics should be accepted as satisfying the Technical Entrance Requirements suggested in Section V for institutions conducting courses of instruction for Dental Technicians, without the presentation of Indentures of Apprenticeship, or a Class C Certificate.

E

THE ORGANIZATION OF THE TEACHING AND EXAMINING BODIES

The foundations having been laid, the Dental Educational Council should proceed with the superstructure. They should draw up a code of regulations governing the personnel, the curriculum and the equipment for any institution conducting a course of instruction and bestowing a degree upon Dental Technicians. Dental Colleges should be urged to organize departments for this purpose, and wherever individual enterprise undertakes to create special institutions for the same object nothing should be left undone to secure the co-operation of the founders with the Dental Educational Council.

1538 Bank of Commerce Bldg.

LAW ENFORCEMENT

BY ALPHONSO IRWIN, D.D.S., CAMDEN, N. J.

A CERTAIN proverb declares: "A lie will travel a thousand leagues while the truth is pulling his boots on." Change the idea somewhat and transcribe it thus: A transgressor will travel a thousand leagues while the law is pulling his boots on.

The staggering lack of the world today is not so much new laws as it is the need of more law going around in boots. The outlaw is outstripping both the truth and the officers of the law. Nay, the lie and the outlaw often outwit the truth as well as outstrip it. Before the truth is out, the evil bird has flown to parts unknown, while words more forcible than elegant follow his exit; for if it takes a smart man to make a rogue, would it not require a smarter man to catch him? If it takes a thief to catch a thief, put the *reformed* thieves on the job. Wit, and speed, and time, then, are factors in law enforcement. Words count for naught.

WORDS. Underlying lawless conditions are some plain facts with which we must grapple. That such conditions always prevail after great wars is good philosophy for plutocrats enriched by war, but it is *piffle* for the victims of lawlessness. The law exists. Men know its import. But the trouble is, we are so long on words and so short on enforcement. The appalling orgy of crime which is rampant throughout the world today is the outcome of disbelief in laws, and contempt for their executors. When we quit mouthing words, cut out unjust legislation, and put on our law-enforcement boots, then men will respect governments. Order will supplant anarchy. Truth will triumph over falsehood. Peace will be restored, when *deeds* replace *words*.

JARGON. Legislators are prone to multiply laws and pull the teeth out of good ones. The unscrupulous and crafty politician amends a virile act by substituting false teeth in it. When he can't do this, he files the sharp points off the fangs. A law without adequate penalties for its violation is edentulous, an idle threat, vain repetitions, a mystifying jargon, and the inane product of political deadlocks.

SPECTRES. A manacled penology is the toothless spectre from the departed spirit of deleted statutes which haunt the courts prior to taking a long hike into *spookdom*. Our statute books are decorated with wordy specimens, artistic and beautiful sets of artificial dentures, so to speak, which are better suited to fill the show cases in front of the parlors of advertising charlatans than libraries of reputable lawyers. Herein lies the explanation for the disregard of the law. Impotence emboldens outlawry; brigandage laughs at bars and bolts; murder gambles with electrocution.

Where law enforcement ends, tyranny begins. Scrap Justice and you flaunt the red flag. Paralyze enforcement by supineness, and you enlist under the red flag. Antagonize law enforcement, and you are marching in the rank of the *Reds* to battle. If might makes right, violence wins. But if right makes might, you join the toothless bogies in their headlong flight to perdition.

THE BATTLE. The gauntlet has been cast, the eternal contest is on. Which side do you espouse? There are no neutrals in the fight between Right and Wrong. You are either for law enforcement or against it. You can't travel in a Pullman to Paradise, in this life. This idea was what caused the World War. It is now the cause of all the world-wide unrest. We were all trying to ride in a palace car to glory. But we were so hampered by greed, overweighted with riches, overcome by lust, and so saturated with materialism and "isms" of all sorts, that we missed the train. Now it is too late to get aboard. For the *Reds* have slain the Men in Boots who were guarding the rails of law and justice, over which governments hitherto hauled their train-loads of precious human lives in safety. Without even flagging the train, the *Reds* have torn up the tracks of law and justice, and new Men in Boots must take the place of the fallen; while the most of us have to hoof it to Elysian Fields instead of being borne along in enameled chariots or under the wings of the flying machine propelled by the explosive energy of the odoriferous gasoline.

ISSUES. The issue of the battle for Law Enforcement is left to *you*. For experience has conclusively proven that in a Republic, Prosecutors of the Law, the Men in Boots, must have the aid of the majority of the responsible citizens composing its commonwealths, before they can enforce the law successfully. Will *you* fight against the saturnalia of crime, a manacled constabulary, venal legislators, vicious laws, and the rape of Justice? WILL YOU?

HOW LONG? Meanwhile the cry resounds piercingly throughout the land: How long must our legislative closets be crammed so full of grinning skeletons that the doors *will* fly open and expose to the public gaze the corruption within, in spite of the most frantic efforts to keep the doors shut? How long must Investigating Committees appointed by Congress, *need* to be *investigated themselves*, after they have completed their investigations? How long must our Senate Chambers resemble Halls of Morpheus, in which bewhiskered Rip Van Winkles repose upon soft slumber-pillows, muttering explosive adjectives and ornate phrases in their sleep, to pull the wool over the eyes of their constituents, and put up a bluff which deceives no one, least of all the Arch-Deceiver himself? Meanwhile, Procrastination, that sleek thief of time, is robbing the Treasury, and people are pawning their clothes to get food and fuel, while STRIKES, BLOODSHED, BOYCOTTS, LOCKOUTS, FEUDS AND REPRISALS PAVE THE WAY TO FAMINE AND THE GRAVE. How long must laws be emasculated and law-enforcement be ham-strung by clashing partisans for the benefit of PROFITEERS and the REDS?—for the PROFITEERS are the BOLSHEVIKI OF FINANCE. How long must Justice, like Andromeda, be chained to the rocks, where cruel vultures of lust pluck out her eyes, while she is exposed to the fury of the Monster-Gorgon—GREED, at sight of whom the heart of the opulent is turned into stone? "How Long?" is echoed by prostrate nations, bleeding humanity, Starving Millions.

425 Cooper St.

National Society of Denture Prosthetists

The National Society of Denture Prosthetists announces a two-week conventionat Milwaukee, August 1-13, immediately preceding the convention of the National Dental Association. The program includes many eminent men, known the world over for their work, while the names of the most illustrious men in the profession appear among the membership. The program includes two days' open sessions, to which every member of the National will be welcome, Aug 11-12, when men like Monson, Cross, Essig, Tench, Nelson, and Supplee will occupy places on the program. On August 12 there will be a joint meeting with the American Society of Orthodontists, when seven papers will be given by Giffin, Gillis, House, A. E. Smith, Colburn, Shearer and Eby, discussed by Hall, Tuckey, Campbell, Lucas, Furnas, Gardiner, Stansbery and Lewis. Two full weeks; two full days open to all N. D. A. men, just before the National meeting. Don't forget. Go if you can. No such meeting ever held in the history of dentistry.

PRESIDENT'S ADDRESS*

W. T. MARTIN, D. D. S., BENSON, N. C.

IT IS a great pleasure—indeed, one of the greatest of my professional career—to be here and to greet this august body, which represents the highest ideals of our profession, as the North Carolina Dental Society assembles for the forty-sixth time to discuss activity in dentistry.

I wish to thank the other officers, members and various committees for their hearty co-operation and faithful endeavor to make this meeting of our organization a success. These men have worked hard and faithfully in preparing a program, and we can show our appreciation of their efforts in no better way than to be on hand when the time comes for the lectures and clinics to begin. The better attention we give the more we will get out of the meeting.

The following are the only recommendations—rather, suggestions—that I have to make:

It occurs to me that it might be well for us to follow in the wake of the National Association and arrange to elect a president-elect each year. This would give the incoming presiding officer a year in which to better familiarize himself with matters and to select the different committees with whom he could best work. The other is nothing new whatever; it is merely endorsing the idea Dr. Squires advanced two years ago relative to what is known as "The Oklahoma Plan." There are those who are inclined to disapprove because of the fear of lack of support and enthusiasm among the members. I respect their opinion and suggest as a substitute the organization of what might be known as an Auxiliary Club of ten or more (I would like to be one of this number) that would take the responsibility of staging such a course, or a modified form of it, to be given at the place the State Society meets, but not to take its place or conflict in any way, and thus give the plan a thorough test. If it is a failure, let the men constituting this club shoulder the loss; if it is a success, give the Society the privilege of taking it over with any and all funds that may have accumulated.

I do not mean to minimize in the least the work the Society has done, for it has accomplished many and great things; but I fear that it is going to find it hard to keep pace with what others are doing if we continue to follow in the same paths we have trod for so many years. It seems to me that in our own organization, like in so many other matters and lines of endeavor, there is a call for something akin to reconstruction or an adjustment to new ideas, thoughts, and ideals so different from those that existed during war or pre-war times. We are meeting today in an entirely different atmosphere from that which has surrounded us in recent times, but none the less pregnant with perilous and unsolved problems.

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*Read before the North Carolina State Dental Society, 1920.

The past few years were full of unparalleled storm, stress, and anxious tension, of phenomenal waste and stupendous destruction of wealth and life and happiness. We saw the pride of young American manhood rushed overseas to the wavering lines of death in France, with the flower of our profession with them to render service to them and our allied armies. Then we saw the storm lull as if tired of its own fury; the stress slackened; the weary and wounded world takes a resting spell; our dead asleep in foreign but friendly soil, and the living return home again. Today we find ourselves drunk with victory, staggering in our prosperity, vainly attempting to regain our equilibrium, realizing that we are confronted with problems slower of solution but not less serious than those of war. The solution of these demands no less conviction, no less fortitude and zeal and wisdom of leadership, for almost simultaneously with the signing of the armistice there loomed up another danger whose mutterings are heard in our own land. Autocracy is dead, but Bolshevism, which has been described as democracy gone mad, threatens the world, denying all democracy, all authority, all common right and obligation. It is social dissolution into helpless elements that have neither heart nor head to compass their own safety and peace.

The art of right living is the finest of all the fine arts, but it is the one which both individuals and nations are slowest to learn; and in all nations, individuals are readier to learn it than are the nations themselves. These good men who have learned it are the salt of the earth; we find civilized men in every nation of the world, but nowhere in the *world* do we find a civilized nation. "But why speak of such matters here?" you ask. I knew to begin with that they might be considered more or less out of line, but perhaps not more so than are the *times* in which we live. Let me say then that, first of all, if we are only dentists we are very small things; but if you are a man in the broadest acceptation of the term first, and a member of the great dental profession also, then I may congratulate you on your greatness. Fundamental considerations of living must concern all good men, all thoughtful men, all constructive men; all men especially who, by reason of education and position, are responsible for the character of the communities in which they live and for the temperament, peace, and upward lift of the world.

The first consideration of a man in a democracy, then, should be the welfare of his fellowman, and the first consideration with us as dentists *plus* should be the public health. So much disease lies in the domain of preventive dentistry that it is almost a reproach against the profession that so much illness exists. The dentist who has thoroughly cleaned the mouth of a patient, instructed him how, and instilled in him a determination to keep it clean, has rendered a far greater service than one who has neglected it, although he may have made most beautiful restorations; and the day has passed when mechanics in dentistry, though of great importance, is considered the acme of professional service.

The work recently done among the schools is revealing the fact that the public is slowly becoming aroused and beginning to realize that if we are to raise or even maintain our present standard of citizenship we must look well to the health of the children, that we may prepare them for and develop them into our ideal standard. The education of the public on mouth hygiene has as yet only reached the sentinels of the great army of humanity. We must talk, teach, and preach more. Eternal vigilance is not only the price of liberty, but of good health as well. The school, the lecture platform, the stage, and the moving picture should be employed in an ethical way for disseminating this important knowledge. The press is the most powerful agency in the eradication of ignorance and molding public thought and opinion. Then, why not employ it in a legitimate, scientific, and ethical manner? We as practitioners, by word and works, should do our utmost to carry this propaganda to every family hearthstone, and with the slogan, "Let No Tooth Ache," add another, "Let No Mouth Be Unclean."

The public is slow to accept and practice any doctrine until made to appreciate its importance and necessity. The process of teaching may be a slow one, and you and I may not live to see our ideal fully reached, but that in no manner excuses us from giving this great problem our very best energies and efforts.

"If you can climb to the top without falling, do it:
If not, climb as far as you can.
Man is not honored by business or calling,
But business or calling is honored by man."

No one can achieve the highest and best in anything without having an ideal. We must get a vision of the things to be done, and ever keep it before us. If our vision is lost, we are at once like a ship in midocean without either chart or compass. How easy it is for us to do that which costs us little effort, or refrain from doing that which calls for sacrifice.

Surely this oral hygiene movement is a golden opportunity for the dentist to be of real service to humanity, not only in the alleviation of suffering and distress that already exist, but in the evolving of a better and stronger and consequently a happier race of people.

SOME FUNDAMENTALS OF CAVITY PREPARATION*

BY J. H. PHILLIPS, D.D.S., NASHVILLE, TENN.

IN THE light of present-day research we are witnessing a renaissance of dentistry. Our ideas and methods are being subjected to the closest scrutiny. New problems struggle for solution. Truth is being separated from error. The viewpoint as to the real mission of dentistry is changing. This is true not only in the profession itself, but the great parent profession, medicine, is holding out welcoming and even appealing arms, while the laity are coming to us as to members of the great healing art. It is an age of transition. The explosions of a world-wide war have broken up many old combinations which were shackling progress. Along with an expanded horizon, men's wits are being sharpened. The old must vindicate itself or give place to the new.

In these changing times it is of paramount importance that men should keep cool heads and strive to get a true perspective. We must not take for granted that, somehow or other, this matter of progress will take care of itself. No. All human achievement is a result of mental activity. Holding fast to what we believe is right and good, let us be patient in controversy, our minds attuned to catch the truth as it emanates from the minds of others. Let us lay aside all stubbornness in upholding our own pet ideas and theories. We may be absolutely right, yet a dogmatic attitude will not help to establish the fact. All our ideas, when subjected to the cold light of scientific research and to the test of time and practical application, will be either upheld or discarded.

At present we are giving much time and thought to such subjects as Plate Prosthesis, Removable Bridgework versus Fixed Bridgework, Oral Hygiene and Dental Prophylaxis or Preventive Dentistry, and diseases of the investing tissues of the teeth. This list would be incomplete did I not include the subject of Focal Infection, especially in the apical areas. Here we behold a mighty struggle between two contending points of view: the conservative and the radical. The advocate of the one has great respect and even sympathy for the pulpless tooth, called "dead" by some. He treats it gently, affectionately. The champion of the other throws a fit every time he sees a dead tooth in the mouth. He would receive no greater shock to stumble upon a human corpse in the forest. He takes no chances. He is a one-hundred-per-cent. vitality man. This subject is in rather violent labor at present. The truth will emerge, to be sure, but it may require the prolonged services of the most skillful obstetrician. We see two sets of workmen, as it were, digging from opposite directions, and in due time, let us be assured, they will meet, when, lo! the mountain which blocked the train of progress will have been tunneled.

Please pardon this somewhat lengthy preface to the subject of my paper, "Some Fundamentals of Cavity Preparation." I express these thoughts by way of emphasizing the importance of the subject I have chosen.

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*Read before the North Carolina State Dental Society, 1920

Cavity preparation is one of the big things in dentistry. We must put new life into it if we would do justice to the treatment of dental caries by fillings. Many of us are inclined to take cavity preparation as a matter of course, possessing but a smattering knowledge of its great underlying principles, with a sort of hit-or-miss technic developed which enables us to get by. In some dental schools the subject receives little more than passing notice. The student is not thoroughly grounded in the basic principles, and then made to apply them consistently in both technic laboratory and clinic.

The genius of Dr. Black has no greater exemplification than in his system of cavity preparation. It has such a scientific background and is so practical in application that all the adverse criticisms which could possibly be hurled against it have not availed to weaken it. On the contrary, it has grown in popularity as the years have come and gone, and today even old practitioners, to say nothing of young dentists fresh from college, are turning their very earnest attention to the subject. I have yet to find a conscientious follower of Black in the subject of Cavity Preparation who was not for it tooth and nail. It is one of the most fascinating things in dentistry. If any one should care to test this statement let him set himself to the task of mastering the principles upon which the system is based and then strive to carry out the details of technical procedure, and he will be convinced.

Cavity preparation is to a filling what the foundation is to a building. It is just as necessary to perfect the one as it is the other. Carelessness and inattention to details cannot be too strongly condemned in either case.

It follows, then, that if cavity preparation is the foundation of filling operations, the duty of the dentist to master the subject from principles to details of technic is mandatory.

This system of Dr. Black's is the only one worthy the name. He tells us what to do, why to do it, and how to do it, and in language so clear and with illustrations so illuminating that its practical application is within reach of every dentist worthy to be classed as a professional man. You sometimes hear the Black's cavities referred to as "book cavities," meaning that they are all right to describe in a book but of no practical value. Well, the fellow who takes that viewpoint is either ignorant of the system or just too lazy or careless to tackle it.

In the preparation of cavities the dentist should never lose sight of what he is trying to accomplish. He should have in mind a three-fold purpose: (1) The prevention of a recurrence of caries either in structural defects, (as in Pit and Fissure Cavities) not included in the outline of the cavity, or from the spreading of the bacterial plaques (as in Smooth Surface Cavities) from the original point of beginning; (2) such shaping of the cavity as will enable it to easily receive and permanently retain the filling material; (3) the removal of all infected or carious dentin. The first of these involves a knowledge of the causes, nature and progress of dental caries, without which the outline form in cavity preparation would be meaningless. As we all know, cavities as a rule are divided into two great groups, according to the mode of attack of caries. They are either Pit and Fissure Cavities, having their origin in structural defects along the developmental grooves, or in deep pits, or they are Smooth Surface Cavities originating at points on perfectly-formed smooth surfaces where a colony of micro-organisms is permitted to grow without molestation.

Since Pit and Fissure Cavities originate in structural defects, it follows that if, in the preparation of those cavities, such defects are included in cavity outlines there will be no recurrence of caries. In obtaining the proper outline form in Pit and Fissure Cavities we must chip off overhanging enamel till all decayed dentin is uncovered; cut out all fissures to their ends; and if grooves so sharply sulcate as to interfere with the smooth finish of the filling lead into the cavity they should be cut back to where such a finish can be made. Chisels and enamel hatchets are used for cleaving the enamel. Enamel hatchets are really chisel blades placed in hatchet form, and as assistants to the chisels are indispensable. For cutting back fissures and grooves, inverted cone and fissure burs are used, but Dr. Black is partial to the inverted cone for this purpose. It is placed in the cavity and pressed into the dentin just beneath the enamel cap and drawn to the surface. This is repeated, cut after cut, until the desired point is reached. Then if greater breadth is needed, the enamel on either side of the cut is chipped off and the same bur or a slightly larger one passed along either wall, undermining the enamel which is chipped off again. If you have been using a dentate fissure bur for this work all the time, give the inverted cone bur a fair trial and you will be surprised how quickly and effectively it works.

The general form given these cavities is a flat base with parallel walls. We do not need the counter-sunk form, either for gold or amalgam. The scope of this paper will not permit a more detailed description of the preparation of Pit and Fissure Cavities.

In the treatment of Smooth Surface Cavities we face different conditions. The mode of attack and progress of caries are different, and to prevent its recurrence we must possess sufficient knowledge to solve the problem.

We know that once a colony of micro-organisms finds safe lodgment on the surface of a tooth it will spread in every direction, following lines of least resistance, until checked by some sort of opposition. In the main, there are three of these checking agencies: (1) Healthy gum tissue; (2) the friction of food currents, lips, cheeks, and tongue during mastication; (3) artificial cleansing by means of the toothbrush, floss, tape, etc. The first and second of these are not under the direct control of the individual, and may be regarded as constant, while the third is subject to the conscious act of the will of the individual, and is not constant. Therefore we cannot rely on the volitional act of our patient. He may or may not be depended upon to carry out our instructions as to artificial cleansing. As a rule, he cannot be depended upon.

We are forced, then, to make our cavity outlines as nearly foolproof against a recurrence of caries as possible. To do this, margins must be placed beneath healthy gum tissue on the one hand and in those areas on the other where the friction of food currents and soft tissues insures habitual cleansing. Long clinical experience has proved that the rounded angles formed by the junction of the proximal surfaces with labial (or buccal) and lingual surfaces are practically immune as points of beginning of dental caries and from surface spreading also. Absolute immunity of these angles depends upon the proper function of the teeth in mastication. In the act of closing the jaws in mastication the muscles of the cheek are contracted and press firmly against the buccal surfaces of the teeth, while at the same time the tongue presses against their lingual surfaces. Between the contact points of the teeth and these contracted muscles and the tongue are the buccal and lingual embrasures through which the partly comminuted food sweeps on each impact of the jaws. Then, in gathering up the particles of food and piling them upon the occlusal surfaces for the next impact, we have a reverse flow through the same channels. It is these food currents, flowing back and forth through the embrasures, that prevent the colony of bacteria from spreading very far out into the embrasures from its usual point of beginning, which is just to the gingival of the contact point. We see, therefore, that to prevent a recurrence of caries in proximal cavities the gingival margin must be placed beneath the free septal tissue and the buccal and lingual margins carried sufficiently near the angles to reach the protection of the food currents.

This illustrates the much-discussed principle of extension for prevention. Dr. Black has been misinterpreted many times in this great principle. He never intended that dentists should apply it alike in every mouth and under all conditions. He expected us to take into consideration such things as susceptibility and immunity, age, physical conditions, habits of oral cleanliness, forms of embrasures, etc.

The key, then, to this matter of extension for prevention is to place the margins of our cavities either where they will not be overlapped by the bacterial plaque which will form on the filling just where it did on the surface before caries attacked it or where they will be under healthy gum tissue. We cannot go far wrong if we keep in mind those three agencies which serve to check the surface spreading of caries. In this connection it is of the utmost importance that we understand food movements during mastication and the parts played by the friction of the soft tissues.

So much for cavity outlines. Just a few words as to the general form of cavities. Not to take up the seven steps of cavity preparation in regular order, I shall group some of them, as I am speaking to dentists and not dental students. In general terms, we *outline* our cavities; we *base* them; we *wall* them. These call for most of the cutting. The base being the seat for the filling should be flat and at right angles to the line of direct stress. It is the resistance form of the cavity, and has to brace the filling very often against terrific force. Erect walls at right angles to the base to retain the filling in its seat. We do not need barrel-stave walls, nor a cavity of greater diameter at the base than at the orifice. Sometimes we may need to vary this relationship of walls for convenience of manipulation in making the filling. The line angles at the junction of cavity walls should not be rounded but sharp and definite, the idea being to make the cavity form as nearly box-like as conditions will permit. I do not mean that this rule is to be followed with such exact nicety in all cavities. For instance, in occlusal cavities, it is not necessary that the four surrounding walls make definite angles with each other, but they should make a sharp angle with the base or floor of the cavity. In the treatment of proximal cavities, however, all line angles as well as point angles must be sharp and true. This is not difficult of accomplishment provided suitable instruments are used. In this connection I desire to call attention to a set of five instruments designed by Dr. Shotton for making these angles. They are just now available, I understand, and are made by the Cleveland Dental Mfg. Company. Four of them are made in rights and lefts, a pair each for mesial and distal cavities, and one universal instrument. I have the set and am delighted with its use.

I would like to touch upon the treatment of enamel walls, such as correcting inclination, planing smooth, beveling the cavo-surface angle, etc.; also the cavity toilet, which is a thing so often ignored. But many things I must pass up for lack of time and through sympathy with my patient hearers. You will note that I have omitted any special reference to the removal of infected or decayed dentin. As dental surgeons, we all know so well the necessity of thorough removal of all infected tissue it is useless to dwell upon it.

In a general sweep of Black's system of cavity preparation a few principles stand out with individual prominence. For instance:

Outline forms are so developed as to place margins beyond the reach of surface spreading of dental caries. This is sensible, scientific.

Cavities are based and walled so as not only to facilitate the work of filling but to provide the greatest possible stability to the filling itself. Emphasis is placed on sharp line and point angles.

Inverted cone and fissure burs are used almost to the exclusion of all other forms of burs.

Cutting instruments are made to do a great deal of the work, the engine being used as little as possible.

We see men studying Black today as never before. More and more dentists are applying his principles of cavity preparation, and they are not only finding this work most interesting but get a great deal of satisfaction and pleasure out of it. To know that an operation has been done right, that the patient has received the best service we can possibly render, puts a song into the heart and robs dental work of its drudgery. We can never repay the debt we owe Dr. Black. Humanity can never repay its debt to him. What a heritage to leave behind!

VENEREAL DISEASES*

BY DR. LOUIS HOUGH, WASHINGTON, D. C.
REGIONAL CONSULTANT VENEREAL DISEASE BUREAU U. S. PUBLIC HEALTH SERVICE

WE HAVE reason to be proud of the progress and achievement of hygiene, when we recall the fact that the average span of human life has been lengthened in our own country since 1880 to the present time fully eight years.

The average age of death in Chicago in 1870 was fourteen years, in 1890, twenty-two years, in 1918, thirty-six years; this lengthening of the average span of human life in Chicago has been due to the efficiency of city and state health departments, and their various bureaus. Also, improved methods of living, improved sanitation, better medical care, and better care of our babies. In 1880 three hundred and twenty-six out of every one hundred thousand of our population in the United States perished every year from tuberculosis. In 1916 the rate had fallen to one hundred and forty-one and one-half per one hundred thousand, due to the activities of our public health department and other organizations. The decrease in typhoid fever, diarrheal diseases, malaria, yellow fever, and other diseases, amounted in many instances to fifty per cent. In spite of these achievements it has been observed that other diseases are on the increase, notably, venereal diseases, with all their evil and far-reaching consequences.

In 1901 a commission of seven, under the auspices of the Medical Society of the county of New York, made an investigation into the prevalence of venereal diseases in New York City. The reports showed two hundred and forty-three thousand cases of venereal diseases treated in one year in that city. During the same year only 41,585 other cases of infectious or communicable diseases were reported to the health commissioner in New York City.

The statistics collected in 1908 by the Holmes Commission in Washington, D. C., shows that out of 274,611 patients treated in the city hospitals, there were 9,869 syphilitic, 14,435 gonorrheal, and 3,643 chancroid cases. These statistics cover the dependent classes, and do not include cases treated in private practice.

Statistics furnished in 1907 by Lieut. Col. Jefferson Keen, of the U. S. Army, and Charles M. Fisk, of the U. S. Navy, show that the per cent. of venereal diseases in the U. S. Army at that time was one hundred and ninety-six per one thousand, and one hundred and sixty for one thousand in the Navy.

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*An address before the North Carolina State Dental Society, 1919.

The examination blanks of the first million draftees which reached the Adjutant General's office in Washington in 1917 showed that three per cent. were venereally infected, had a venereal disease when reporting at camp. Second million showed 5.4 per cent. venereal diseases arrived at camp. The state having the lowest rate is Vermont. North Carolina is fortieth averaging state with sixty-seven per one thousand infected. Approximately 280,000 cases were treated in the U. S. Army; eighty-four per cent. of these diseases were brought into the Army by our boys, and the other sixteen per cent. contracted within communities under the control of civil authorities. These facts convinced our government that it was not only our Army that had to be made clean, but our Nation also.

Seven hundred thousand of our young men reach maturity annually, and it is estimated that fifty per cent. of these will be infected with gonorrhea or syphilis before they reach the age of thirty-five as result of sowing wild oats, and that ten per cent. of those infected will infect their wives.

Statistics gathered from the private practice of a number of physicians show that thirty per cent. of the venereal infections in women are communicated by their husbands.

The number of syphilitics in the United States is estimated by Doctor Stokes at five million, and the gonorrheally infected at five times as many.

Quoting Assistant Surgeon General C. C. Pierce, of the U. S. Public Health Service, it is costing the United States over one hundred million annually to care for its syphilitic insane. A conservative estimate of all the insanity due to syphilis is twenty-five per cent. Our poor houses, homes for the feebleminded, insane and blind asylums and penitentiaries house some of the end results of these diseases.

GONORRHEA

Gonorrhea is an infection due to a specific germ, the gonococcus, which causes inflammation of the urethral canal, attended with a copious discharge of pus, with more or less painful symptoms, and liable to numerous complications affecting the neighboring structures.

From the medical point of view, gonorrhea is a very serious infection, which, in respect to the character and sum total of its dangers, is scarcely inferior in significance to syphilis. The gonococcus may lie dormant in the prostatic region for years.

Among its local complications may be mentioned painful inflammations of the prostate gland and bladder, sometimes ascending to the kidneys. A common complication is inflammation of the epididymis, the annex organ of the testicle, of an exceedingly painful character, necessitating rest in bed and active treatment for some time.

The inflammation not infrequently causes a complete occlusion or blocking up of the tubes which convey the semen, resulting in sterility or inability to procreate. Sterility in men from this cause is much more common than was formerly supposed. Certainly no greater misfortune could befall a young man than to realize that even if he marries his must be a home without prospect of children. Sterility defeats the supreme purpose of marriage, the procreation of children.

Stricture of the urethra is another complication or sequence of gonococcus infection. The narrowing of the canal may impede or entirely prevent the passage of urine, necessitating a surgical operation.

Another complication of this infection is inflammation of the joints, constituting gonorrheal rheumatism. One or several joints may be affected at the same time or successively. These joint infections are always serious, accompanied with intense pain and stiffness, and not infrequently resulting in permanent stiffness, often deformity, which cripples and disables the patient.

An added and altogether grave significance has been given to gonococcus infection by recent advances in medical science which show that the gonococci, or germs of this disease, are susceptible of being taken up by the blood vessels and lymphatics, and may affect almost every organ of the body with results dangerous and even fatal to life. The gonococci have been identified in the membrane of the brain, the spinal cord, the heart, and other internal organs as well as in the joints, muscles, etc. Such internal complications of gonorrhea often terminate in death.

An error common to the laity is that gonorrhea is easily and promptly cured. While this infection may be cured in a few weeks at the beginning by proper treatment, in the majority of cases it is not properly treated. Many patients look upon it with contempt, or resort to the advertising quack, the druggist, or the prescription of some obliging friend. Most often the inflammation lapses into a chronic condition, termed gleet, which may reveal itself only by a slight mucid discharge or the presence of an occasional drop of pus in the morning, or shreds in the urine. In this condition it may persist for months and years, with only occasional symptoms, but nevertheless susceptible of being excited into virulence by any cause of irritation—violent exercise, alcohol, or sexual intercourse. Gleet is exceedingly obstinate to treatment, and it may require many months or years to effect a cure. It is one of the most common causes of "nervous prostration" in young men.

Apart from its significance to the individual, gleet is the almost exclusive source of infections in women. Many men, believing that the cessation of the acute discharge is an evidence or cure, marry, not dreaming that the little filaments coming up from the depths of the urethra are laden with infection.

In seventy per cent. of abdominal operations upon women where pus is encountered (excluding appendicitis), we find the gonococci.

One out of three gonorrheally infected women are rendered sterile.

Eighty per cent. of blindness in new born babes is caused by gonococcus, and twenty-five per cent. of all blindness is due to this germ.

It is said there are fifteen thousand blind persons in United States from general infection, blinded at birth.

SYPHILIS

On the evening of May 17, 1905, at a meeting of the Medical Society of Berlin, a paper was presented by Schaudinn and Hoffman on the true specific germ of syphilis—the spirocheta pallida, and microscopic specimens were presented.

The finding of the spirocheta pallida in 1905 by Schaudinn and Hoffman, the development of a fairly reliable blood test, such as the Wassermann and other modifications of his reaction in 1906-7, and Ehrlich's gift of salvarsan, 1910, have brought a new epoch in the history and treatment of syphilis that is familiar to you all.

Syphilis is caused by a specific germ, spirocheta pallida, which may invade every constituent element of the body.

Syphilis is a constitutional disease, an infection of the entire system. It is also an essentially chronic disease, persisting for years, it may be during the entire lifetime. After months or years of quiescence and apparent cure it may suddenly reveal itself, five, ten, twenty, or thirty years later by manifestations of the most serious character. The late or most dreaded manifestations of the disease are liable to attack the internal organs essential to life.

For purposes of description, the course of syphilis is divided into three states, the primary, secondary, and tertiary. When an individual is inoculated with the syphilic virus, there is no appreciable evidence of its action for a period of three to five weeks, almost twenty-six days on an average. The first appearance is in the form of a chancre of initial lesion at the point of inoculation. Chancre may occur anywhere the virus gets through skin. From six to eight weeks later, the secondary state is ushered in by the appearance of an eruption on the surface of the body and mucous membranes of the mouth and throat. The secondary eruptions are not as a rule continuously present, but they come out in successive crops during the entire secondary stage, which comprises a period of from two to two and a half years.

The tertiary stage is characterized by lesions which affect the deeper structures of the skin, the bones, the internal organs, and the brain. The duration of the tertiary state is practically indefinite.

During the secondary stage the blood, as well as the lesions on the body, contains the poison of syphilis. For a period of three or four years, sometimes longer, the disease is transmissible both by contagion and by inheritance.

The above is merely an outline of the ordinary course of syphilis which varies in type and severity in different individuals. In general, it may be said that the secondary manifestations have a tendency to disappear without leaving any trace. The tertiary lesions are always more serious; they are ulcerative and destructive; often damaging the structure as well as the functions of the organs in which they develop.

While tertiary syphilis may affect every organ of the body, the cutaneous system, the bony system, the circulatory system, the nervous system, as well as the eye, ear, larynx, lungs, liver, kidneys, and testicles, its most serious effects are manifest in the sphere of the nervous system, which coordinates and controls all the functions of the body. Syphilis is today recognized as the chief factor in organic diseases of the nervous system, and the chief, if not the sole cause of paresis or general paralysis of the insane, as well as ninety per cent. of locomotor ataxia. It is estimated that seventy-five per cent. of ocular paralysis, and a large proportion of the apoplexies are caused by syphilis. Almost every apoplexy occurring under the age of forty in persons not addicted to alcohol, may be attributed to syphilis. The most somber feature of this picture is the exceeding gravity of syphilitic affections of the brain and cord. Few of these cases are cured; about twenty per cent. are fatal; while the larger proportion survive with infirmities physical and mental of a disabling character, which render them a charge upon their friends or fill our hospitals and insane asylums.

It will be seen then that the danger of syphilis to the health and life of the individual is measured by its remote rather than by its immediate effects. The danger of syphilis from cantagion or transmission to others is confined to the earlier years of the disease. The social significance of syphilis is due to the multitudinous modes of contagion, and the consequent infection of the innocent. It is not only contagious through sexual intercourse, but may be spread in the ordinary relations of family and social life. The secretions of mucous patches in the mouth or of any lesion on the body are charged with the virus. Any object on which this virus is deposited may serve as a vehicle for contagion, such as eating and drinking utensils, pipes, cigar holders, etc. Kissing is here one of the most common means of contamination. Numerous cases might be cited, such as that of a member of a graduating class of a neighboring university who, by kissing, infected his mother and his nineteen-year-old sister, who was engaged to be married. A leper is infinitely less dangerous to others as a source of contagion than a syphilitic.

Such are some of the undeniable and scientifically demonstrated dangers of a class of diseases which constitute a veritable peril to the individual, and a still greater peril to society and the race. Apart from their menace to the public health, the special significance of these diseases as a social danger is due to the fact that they specifically affect the system of generation—gonorrhea, by its sterilizing influence upon the procreative capacity of husband and wife; syphilis, by its blighting, destructive effect upon the children.

A large proportion of men contract these diseases, and many, believing themselves cured, it may be, introduce the infection into the family. This infection in his own home of the innocent whom a man is under the most sacred obligation to protect, is the saddest of all the consequences of a licentious life.

Syphilis is the only disease which is transmitted to the offspring in virulence, and its hereditary effects are appalling; from sixty to seventy per cent. of children who inherit syphilis are born dead or die shortly after birth (Monom). Those who survive are, as a rule, physical and mental weaklings.

The National Cash Register Company, some eight years ago, had a number of slides made illustrating venereal diseases, which were shown to their employees. They became interested in these diseases because one of their men lost his eyesight through gonorrheal infection, and one of their women became infected with syphilis in the dental chair. At one camp I was in during the war two dentists got the initial lesion chancre on their hand while working on their patients. Dr. Griffith says he has seen and treated over two hundred cases of chancre situated on some part of the mouth, throat or nose, and that eighty per cent. came by it innocently, or by the carelessness of others.

In view of the foregoing facts it would seem a wise precaution for the dentist to thoroughly disinfect every patient's mouth, and, in many cases, to protect himself by wearing rubber gloves.

Undoubtedly a large number of your patients should have a Wassermann and you would be doing your duty to your patient and to the public by always bearing this in mind.

The Surgeon Generals of the Army, Navy and Public Health Service did wonderful work in combating these diseases during the war. Now it is the duty of the civil communities to continue this fight with vigor. In the continuation of this fight the Government has a part, the State has a part, the counties, cities, medical profession, dental profession and public have a part.

The Government is doing its part, as evidenced by the passage of the Chamberlain-Kahn bill, July 9, 1918, which passed both houses of Congress unanimously, appropriating four million dollars for this work.

Section 1 of this bill created the Interdepartmental Social Hygiene Board, composed of the Secretaries of War, Navy, and Treasury, and the Surgeon Generals of the Army, Navy and Public Health Service, or their representatives. Section 3 established a division of venereal diseases in the U. S. Public Health Service. Section 6 appropriated one million dollars annually for two years, to be allotted to the States on the basis of population, for the use of their departments of health in the prevention, control and treatment of venereal diseases.

State boards or departments of health received their respective allotments by agreeing to cooperative measures and regulations approved by the Surgeon Generals of the Army, Navy and Public Health Service, and Secretary of the Treasury, under which the appropriations shall be expended; forty-six states have received their allotment.

The general plan for venereal disease control and prevention is as follows:

First, the reporting of venereal disease in accordance with State laws or State boards of health regulations; *second*, repressive measures, including isolation, and treatment in detention hospitals for those who are unable or unwilling to prevent themselves from becoming a menace to others; *third*, establishment of free clinics for treatment, and laboratories for diagnosis, and examinations to determine when patients may be released as noninfectious. (Reprint 477 and amendment of quarantine). The fourth part is an educational campaign to inform the public as to the nature of these diseases and the manner in which they are spread. The whole work is to be carried on in the same manner as for any other communicable disease. Literature has been sent to 140,000 physicians, requesting cooperation, 48,000 druggists to stop selling quack remedies; also to dentists, hospitals, medical colleges, ministers, public educators, 20,000 newspapers and various organizations. Thousands of replies are being received heartily indorsing the campaign, and all but one hundred and forty of the newspapers agreed not to carry advertisement for quack remedies.

We cannot stamp out malaria simply by treating the victims, yet we must treat them. We cannot stamp out typhoid or yellow fever by caring for the victims, yet we must care for them. To stamp out disease we must get at the cause. The establishment of clinics is necessary for the treatment of the victims of venereal diseases. Prostitution being the most prolific source of infection, must be fought to a finish. It is a self-evident fact that every case of venereal disease of tomorrow will be the result of a case existing today, and that the feebleminded child of tomorrow is the natural product of the venereally infected parents of today. It should be borne in mind that the eradication of communicable disease is the highest aim of scientific medicine, and in this effort the loyal support of the legislators and the cooperation of the physicians, dentists, patients, and the public is of the utmost importance. The community is entitled to protection because these diseases are communicable. Syphilis especially in an extra-genital way such as by kissing, in barber chairs, in dental chairs, by smoking pipes, lead pencils, toilets, drinking cups, etc.

It is clearly the duty of every physician and dentist to take a deep interest in this campaign, because it is a medical, moral, social, and economic problem that involves our Nation.

It is the duty of every professor of every medical school to point out the far-reaching consequences of venereal diseases.

Every medical student should know how to treat these diseases to a successful conclusion. In the light of our knowledge of gonorrheal epidemics in children's and babies' hospitals, nurses should be instructed as a matter of self-protection, and as a means of preventing the spread of infection to innocent victims.

It is the duty of every official to enforce laws requiring the reporting of venereal infection. To prevent the spread of disease it is necessary to locate the source of infection.

We find in the Declaration of Independence that we are endowed with unalienable rights, such as life, liberty, and the pursuit of happiness, and to secure these rights a Government was established, and when these rights are assailed, as they recently were, we rise united and expend our billions of dollars and our blood to defend our rights and protect our democracy. The strength of a nation depends upon the health of the nation. We find that our strength is being undermined by venereal diseases. These diseases are communicable, preventable and curable; now let us all assist in this national, and soon to be international, fight to eradicate these venereal diseases, which will do much to bring health and happiness to our generation, and also help make the world safe for posterity.

As a matter of dollars and cents, is it not wise to expend one or ten cents per capita annually in prevention and cure of diseases which are now costing us approximately one dollar per capita annually to care for in our insane asylums, homes for feebleminded and blind asylums ?

REPORT OF THE COMMITTEE ON DENTAL SCIENCE AND LITERATURE

CALIFORNIA STATE DENTAL ASSOCIATION

(For The DENTAL SUMMARY)

By H. Edward Gedge, M. D., D. D. S., San Francisco, California

THE ARTICLES on crown and bridgework appearing in the dental journals during the last few years carry messages of appeal to the profession to give this branch of practice the same degree of care in determining the class of appliance and the same character of constructive skill as the dentist exercises in his operative dentistry. This is shown in an article by Karl G. Knoche, D. D. S., *Journal N. D. A.*, Vol. 5, No. 4, entitled "An Effort to Fix a Standard of Crown and Bridgework on Scientific Principles Consistent with Proper Requirements."

This paper, read before the Crown and Bridgework Section of the National Dental Association, was to have been the duty of Dr. Forest H. Orton, St. Paul, and ill health preventing, this duty fell to Dr. Knoche. It is an endeavor to bring order out of chaos.

Art to become scientific must adopt a standard. What Dr. G. V. Black did for operative dentistry in his "Extension for Prevention" can be done for crown and bridgework if efforts are based on scientific principles, and will be accomplished when we have proven and accepted standards of operation.

It is stated that fifteen percent of the dental work is crown and bridgework and is doing more harm than any other class of work. And no research work beneficial to the profession is being done, no investigation is being made as to why this crown and bridgework is doomed to failure. The only work of research is carried on by individuals at great odds, influencing very few. The paper calls for a Research Commission, asks the interested members of the National Dental Association for unbiased, open-minded thought. It complains that one group of men teaches a certain technic, only to be torn down and ridiculed by another group. The profession is easily swayed by likes and dislikes and true merit of much has been thus lost.

We should know first what bridgework is, what should be accomplished by its use, what it should be, and what it should not be. This requires, also, a standard of criticism. We should have a classification of favorable and unfavorable conditions. A radical change is asked in the teaching of the subject; instead of a mass of detailed technic, more attention to the essentials and fundamental principles involved. Crown and bridgework must be taught as a separate subject apart from prosthesis. Greater attention to dental anatomy and physiology, occlusion and articulation.

Dr. Orton's definition of crown and bridgework is given in the paper thus: "A Method of Correcting or Perfecting Malocclusion in an Arch Mutilated by the Loss of One or More Teeth."

The paper states that malocclusion resulting from a loss of one or more teeth often produces degenerative changes. Also, interferes with the function of the organ of mastication and the specialized functions of the individual teeth. So the purpose of crown and bridgework is the necessity of preserving the normal functions of the organ and the individual teeth, so he begs to present the essential principles to found the subject of crown and bridgework. Some of these essentials predominate the others, and some number of essentials contributes to a principle.

First, he emphasized the importance of dental anatomy. He says foil, amalgam, and inlay operations need this essential, but men forget this need in crown and bridgework where occlusal restorations, tooth shape contours, are very essential. The crown and bridge worker may pay attention to occlusion, and forget gingival contours, contacts, embrasures, buccal and lingual contours and so permits the food to pack against gingival tissues with resulting inflammations, etc.

The author calls attention to occlusion, vital for proper balance of strain, etc., for proper function of organ of mastication, but only valuable when a proper articulation is also present and this must be a perfect articulation if the maintenance of normal functions is obtained. He calls attention to tooth form directing the food away from the gingival trough.

That the economic problem is present and man must live and be efficient as possible, is touched upon. That fixed and removable bridges and partial plates, all operations, may be made more efficient if the principles are carefully observed. He states that a fixed bridge constructed with regard to dental anatomy, occlusion and articulation will act as a perfect part in the masticating function, protect the soft tissues and be better than a removable bridge made without regard to these essentials, these principles being observed by the maker of the fixed bridge.

His plea is to raise crown and bridgework to its proper position by combining technical skill with a deeper knowledge of the fundamental principles.

"Principles and Practice of Removable Bridgework," by Frederick A. Peeso, D. D. S., New York, appears in the *Journal of the National Dental Association*, Vol. 5, No. 9.

Dr. Peeso states the first or fixed bridgework made the need for a better and cleaner method of restoring lost function apparent to the leaders of the profession and the intelligent laity.

The appliance, to be sanitary, must be readily removed and cleansed thoroughly. The principal cause of failure of the early removable bridgework was lack of knowledge of mechanical principles involved, little attention to proper treatment of roots, little attention to the preparation of roots for reception of crown, *et cetera*. With the advent of the X-ray, he states all root canal work is simplified and no excuse for wretched canal work.

Advantages of Removable Work Over Fixed—He states it can be placed wherever fixed work is, and at better advantage; even splints are preferable if made removable. In case of accident, easy quick repair, without pain or discomfort. When other operations in the mouth are necessary, the removable appliance permits ample room and no interference. It is more sanitary, the abutments easily cleaned, the possibilities of bridgework are extended, as seen with extension bridges with saddles to supplement the abutments.

The author states that saddles used in extension bridges supplement the abutments. The success lies in the adjustment of saddle to ridge. When properly adapted and under pressure, the relation of the saddle and abutment caps is taken with plaster, soldered rigidly, otherwise the work is short-lived. The author does not believe in movable attachment to the saddle as an experience of twenty-five years shows constant movement of saddle on the ridge tends to loosen abutments and cause rapid absorption of the tissues.

Success of Removable Bridgework—Depends on accuracy, considerable skill, great attention to details.

Types of Attachments are telescope crown, tubes and split pins with various modifications.

Telescope crowns for molars and bicuspids only, and rarely on the bicuspids. Coin gold alloy is used for rigidity, crown consists of two tubes, telescoping, or sliding one over the other, fitting accurately. The inner tube of thirty gauge coin gold with slightly conical shape, larger at the gingival end and short enough for thick cusps, has a floor of twenty-eight gauge coin sweated to it. This is filled with a fusible metal and an outer tube of a measurement taken just below the occlusal end of the inner band is made and driven and stretched over the reinforced inner tube or cap, making an accurate fit. It is festooned to follow the gingival edge, coming to one thirty-second of an inch of the tissues. It is burnished slightly to loosen it and separated from the inner cap and a floor of twenty-eight gauge coin sweated to it, contoured with soldered gold strips and a solid cusp soldered upon it. In very short crowns, a tube and split pin in combination with the telescope is used. A tube is fitted to the bottom of the pulp chamber and soldered to the floor of the inner cap. A split pin is fitted to the tube and soldered through the cusp of the outer cap. This makes a crown for a short stump for short bites and also in long crowns where there is one retaining abutment only.

The inlay abutment is for both anterior and posterior attachments, especially short bridges. In posterior teeth, occlusal-approximal cavities are used. In anterior teeth cavities on the lingual surface approximating the space. The cavity is prepared and a tube is dropped to the floor of the pulp chamber and a little distance into the enlarged canal, inlay wax is introduced, running it well around the tube, and a casting made, placed in the mouth and articulated. Impression then taken, model made and work then proceeds on the model. A second inlay is prepared.

The inlay with tube on the model has a cavity cut into it, prepared with stout walls for thick margins of gold intact. The entrance to tube is enlarged a split pin fitted and bent at right angles to the tube. The extending surplus metal resting in the groove. The second inlay is made by waxing carefully, removing and casting around the pin.

Instead of casting, the author prefers to fit a pure gold matrix into the cavity of the first inlay, pass split pin through the bottom of the pure gold matrix and into the tube. Wax with sticky wax, invest and fill with coin gold.

Attachments for the Anterior Teeth. Cups with Tubes and Split Pins—Prepare tooth as for Richmond crown, removing enamel and contour. Fit band, solder floor twenty-eight gauge. When fitting tube into canal have opening through the floor of cap larger than tube to allow for counter-sinking. The cap in position, fit tube to canal, wax and invest and solder to floor. Cut off surplus tube. Enlarge opening into tube, fit split pin, place floor of outer cap with hole for pin upon the inner cap. Wax, invest, solder. Replace the pin and floor on the inner cap, grind flush to the sides of inner cap. Fit a half round band of twenty-eight gauge gold to the lingual side, extending to the labial side of pin, coming just about to the gum margin; wax and solder. To this is soldered the facing or crown.

These attachments with slight variations can be used in any case of removable work and give satisfaction for many years.

REPORT OF THE COMMITTEE ON PUBLIC HEALTH OF THE CLEVELAND DENTAL SOCIETY

ANNUAL MEETING, May 2, 1921

Your committee begs leave to make the following report:

Our efforts have included a study of the needs of the community in matters of health, which relate to dental disease—its correction, treatment and prevention. We have co-operated with the Commission on Hospital and Health Survey, appointed by the Cleveland Hospital Council, and the Commissioner of Public Health. We find that there are many matters in which the best interest of the citizens of the community can be better served. The chief of these we have discussed, briefly, under the following separate heads for this report, Dental Service in Hospitals—Mouth Hygiene—Public Dental Service—the Dental College.

I. Dental Service in Hospitals

The Hospital and Health Survey, in its very exhaustive report covering a thorough canvass of the whole problem, sums up its finding in the following recommendations, which we endorse: (See Part 8, Page 690).

"The dental surgical service at City Hospital be increased fourfold.

"The Hospital Council prevail upon at least two other of the privately endowed hospitals to establish out-patient dental service.

"A dental surgeon be appointed on the visiting staff of each of the larger hospitals and a dental interne be provided to carry out such prophylactic and reparative work on patients as their condition permits or requires.

"A dentist be provided at Warrenville Infirmary.

"Both medical students and nurses receive in their preparation to practice, instruction in the principles of the cause and prevention of dental disease and that nurses receive practical training in the technic of cleansing patients' teeth."

Your committee has limited its discussion of this subject in this report to one phase, viz., the importance of, and the method for, making hospital dental examinations. We feel that the time is now long over due when the physical examination of all patients admitted to hospitals should include a mouth examination by a competent dental surgeon. We wish to emphasize the fact that such an examination made by any one but a trained dental or oral surgeon is usually a farce.

The literature of the medical and dental professions and of all health agencies is full of records indicating the great prevalence of mouth infections and of their frequent serious contributions to the pathological conditions which result in various systemic diseases. Yet, at the present time, in Cleveland hospitals, practically no effort is being made to ascertain the mouth conditions of patients admitted and almost nothing is being done for the relief of patients known to have mouth infections except in cases accompanied by so much pain that the patient insists upon relief when emergency treatment for the pain is administered—frequently by a nurse or medical interne, neither of whom is properly trained for such service. It would seem to be axiomatic that as a routine prophylaxis every sick person should be freed from mouth infection since the whole problem of rebuilding is intimately associated with the mouth.

To the end that the grave influence of oral infections upon the recuperative powers of patients suffering from systemic lesions be recognized and that mouth hygiene be given its proper place in curative procedures, it is urged that hospitals be induced to require adequate mouth examinations upon admission of patients, just as they require of public and private patients, certain definite routine pathological examinations, the results of which must appear in the hospital records. If this be done, the high percentage of mouth infections will become so appallingly apparent that it will compel the institution of mouth treatment as a regular part of the patient's care.

There is abundant evidence to be obtained from the experience of institutions which have included removal of mouth infections in the program of their treatment, to indicate its positive value as a curative measure, and also its economic value in the definite shortening of the time the patient is required to be kept in the hospital.

Your committee recommends that the Cleveland Dental Society earnestly urge upon the management of all institutions for the care of the sick that a careful mouth examination by a competent dental surgeon be made a routine requirement for the admission of patients.

II. MOUTH HYGIENE

Since practically the whole series of evils accompanying and growing out of dental infections, whether of the gums and supporting structures of the teeth or of their pulps, have their origin in unclean infected conditions of the mouth, the matter of paramount importance is the maintenance of a cleanly mouth. It is probable that no one thing that can be done for the human body will accomplished so much for the maintenance of health as will mouth hygiene. It is also true that for very many people who are sick and whose resistance is broken, no one thing will do so much to assist the body in regaining its vitality as will the removal of dental infection with thorough and efficient prophylaxis. For this reason every child in our public schools should not only have dental inspection but regular and frequent oral prophylaxis by dental hygienists or specially trained dental nurses.

It is a question if any money could be expended by our municipality which would yield so large dividends in efficient healthful citizenship and the reduction of city expense for hospital maintenance in the years to follow as will the maintenance of these dental hygienists. This has been demonstrated in many places, conspicuously in Bridgeport, Connecticut, where communicable diseases were reduced about fifty per cent by this service, and the service pays for itself by the money saved through the reduction of the number of repeaters requiring the expense for teaching an extra year. The need for this service is particularly great in our hospitals and dispensaries.

It has been demonstrated that the average stay of patients in those hospitals which provide this service in an adequate form is enough less to largely take care of the expense for the service. It is a matter of keen regret and chagrin that Cleveland should be so far behind in this regard, for no hospital of this city is furnishing an adequate dental service and most of them have little or none. We strongly recommend that the Board of Control responsible for same shall take such steps as may be necessary to establish mouth hygiene in all the schools of the city and to secure provision for its establishment in all our hospitals and eleemosynary institutions.

The Hospital and Health Survey report makes very frank observations regarding our activities in orgal hygiene, both as to detail of methods and by comparison with other cities. It states:

"Free dental work in Cleveland is supplied at six public schools, at three health centers and at one hospital (City Hospital). There are ten chairs in use and 156 clinic hours a week, or a total of 6,900 hours a year of service offered. The work is mostly for children and for hospital out-patients. A dental dispensary used for teaching purposes, operating 80 chairs, is maintained on a more than self-supporting basis by the Dental College. The fees charged are similar to those charged by beginning dental practitioners.

"In Boston five institutions offer either free or at-cost dental services with a total of 247 chairs used for 5,956 hours a week and 309,712 hours a year. In the city of Rochester, N. Y., there are 38 chairs almost exclusively for children's work." (Part 8, Page 684.)

"All the groups with whom the Survey staff has come in contact, such as visiting nurses, charity and social agencies, settlement houses and the foreign-born have emphasized the inadequacy of dental service in Cleveland. When it is seen that almost as much public dental dispensary service is provided in Boston in a week as in Cleveland in a year, the reason for complaints is plain." (Part 8, Page 685.)

"One of every 15 deaths in Cleveland last year was reported as due to heart disease."

"But it is not in the actual loss of life that we see the greatest drain upon the community; it is in the mass of children and elders who lead handicapped, stunted, painful lives because of their chronic disease of the heart." (Page 213, Part 2.)

"We may conservatively estimate that two per cent of the population, or in the United States over 2,000,000 persons, and in Cleveland 16,000 persons, suffer from serious Heart Disease. (Part 2, Page 214.)

"The prevention of heart disease in young people is of the greatest importance because of their age and the cost of their care to the community.

"The chief cause of heart disease in early life is acute rheumatism. Although we do not know definitely the causes of acute rheumatism, enough work has been done to make us quite certain that we are dealing with a germ disease, an infection which probably enters through diseased tonsils, adenoids or decayed teeth." (Part 2, Page 216.)

Among the means of prevention of cardiac lesions may be mentioned:

"Control of infectious diseases.

"Care of teeth, tonsils and adenoids." (Part 2, Page 217.)

"In connection with the dental clinics, a system of oral hygiene should be maintained, and all children of *pre-school age* should receive the advantage of this service. It has been proved definitely that proper methods of oral hygiene, begun in early childhood, have a more definite and lasting effect in preserving the teeth than any future corrective work can possibly accomplish. Moreover, the cost of proper oral hygiene is only a fraction of the cost of corrective dental work. To be effective, oral hygiene should be commenced before the child's second teeth have begun to appear, and certainly well in advance of the appearance of the first permanent teeth—the sixth year molars." (Part 3, Page 286).

(In August, 1920, the first pre-school age clinic for Mouth Hygiene was established at the Babies Dispensary and Hospital, Cleveland.)

The Survey makes the following recommendations, that:

"Measures be taken to obtain such amendments to the State Civil Code as will permit the licensing of dental hygienists and their employment in private practice and in public institutions, under the direction of licensed dentists.

"The training of dental hygienists be undertaken by the College of Dentistry.

"The Board of Education aims to provide a gradually increasing service which within the next five years will put all school children under adequate periodical dental inspection, cleansing and repair. Prophylactic cleansing of children's teeth twice a year is adequate. Tooth brush drill should be a part of school education.

"Those responsible for the children attending the parochial schools institute dental service similar or equivalent to that advised for the children of the public schools.

"Administration of all public dental school and dispensary services supported by the taxpayers be put under the direction of one competent full-time paid dentist, within the Division of Health or under the Board of Education.

III. Public Dental Service

On this the Survey comments:

"Self-supporting public pay clinics, operated under strict professional control as to services and prices, are needed and would meet a real demand for those of moderate means." (Part 8, Page 685.)

"For clinics which aim to be self-supporting * * * the fee should be not less than 50 cents a visit, and may be higher for certain classes of services. The basis on which such fees should be adjusted is the cost of service." (Part 10, Page 913.)

"Dental repair work among children has been reduced by 50% by the employment of dental hygienists." (Part 8, Page 689.)

The Survey makes the following recommendations:

"The dental surgical service at City Hospital be increased fourfold.

"The dental surgical service for out-patients at Mt. Sinai be increased as soon as funds can be obtained."

Other comments were made in the Survey report, which we have already quoted under the headings of Dental Service in Hospitals and Mouth Hygiene.

Your committee finds one phase of this work requires very special consideration. *This is Dental Service for Suffering Bed-Ridden Poor.*

It is a crying shame and a reflection upon each, our fair city, the Health Department and the healing professions, particularly the dental, that there is no provision for the dental relief and care of those poor bed-ridden, suffering poor, either from the immediate pain of dental infections, or their elimination, as a means of relief from those systemic afflictions which are seriously aggravated by dental infections.

Theoretically, perhaps, they should be taken to the City Hospital for this service, but there are no beds provided for purely dental cases, no provision for their transportation there for this service, and the available staff is so inadequate for even the present demands that patients now walking to that hospital for dental service, frequently have to come on two or three succeeding operating days before they are able to have their emergencies cared for, many times suffering severely in the meantime. This is not due to any fault of the men in charge of that service, but entirely to its inadequacy to take care of even the present need. There should be several full-time operators.

The majority of these individuals, however, can best be taken care of at their homes by a visiting dental surgeon and nurse equipped to give local and general anaethetics and make such operations and treatments as are necessary to take care of immediate discomfort and the removal of serious contributing dental infections. We strongly urge the establishment of this service as a department of public health and so related to the visiting medical and nursing services as to provide for complete and prompt co-operation.

IV. The Dental College

The Survey comments as follows:

"This professional school has passed through many financial, educational and administrative vicissitudes and at present is within reach of standards and support which will entitled it to rank with the best.

"Its present needs are more teaching room, a moderate increase in its equipment, a small outlay for a simple teaching, reference and periodical library, improvement in the teaching of anatomy and pathology in conformity with the high conceptions and standards of these departments in the medical school and a considerable increase (10) in the teaching staff, especially of full-time men in the laboratory and clinical courses.

"More students are now accepted than can properly be accommodated and taught. An increase of 50% in the space is needed, if an entering class of 75 is accepted. It is estimated that $200,000 will be needed for additional space in the next five years. Probably $10,000 would meet the lack of equipment now.

"The absolutely indispensable in the way of books and periodicals for teachers and students would cost about $4,000.

"To pick teachers of dentistry simply from among successful practitioners will continue here the same misfortunes and inadequacies which have been a plague to medical education. The men selected must expect to make teaching a career and be fit to employ permanently as such.

"As soon as the obligations assumed by the University when it took over the school from its commercial supporters are paid off, an endowment should be raised for the support of dental teaching. Within the next five years this school needs a million and a quarter of dollars to provide the grade of education for which applicants are clamoring, in numbers the University can not accept.

"The College of Dentistry would profit greatly from organized interest, criticism and support by the Cleveland Dental Society. The school and the profession cannot get along without each other and for the credit of both they should have mutual support, which does not exist at present.

"There are no facilities for graduate education of dentists. They should be developed and offered by the college." (Part 8, Pages 688 and 689.)

The Survey makes the following recommendation:

"Sufficient financial support be obtained for the College of Dentistry to provide adequate increase of space, teachers and equipment, a library, and freedom from debt on account of obligations to commercial interests.

Your committee believes that the time is coming when every citizen of the City of Cleveland and the members of the dental profession of this community will be justly proud of the Dental Department of Western Reserve University because of the institution of a policy which will provide for making it one of the leading dental institutions of the country.

We recommend every effort that is being made to provide for the safety of the public through the raising of standards of manhood and professional attainments in the graduating classes. We heartily commend the raising of the entrance requirements by the providing of a pre-dental year and by the raising of the standards of the teaching staff. We would strongly urge that the fullest support of the dental profession of this community be given to each, the officers of the school and the President and Trustees of the University to the end that means will be made available for the proper financing of the work of the dental department, thereby making possible a staff of competent teachers able to lead the student life to a position of dental vision where they will be capable of comprehending the great responsibility of the dentist in the matter of the health of the people of the community and to the conception of dental practice as expresssed in service rather than as a means for gain.

We recommend that the work of this committee be assisted by the provision of a small fund for the incidental expense desired for enlarging the work. We are deeply impressed with the need for more efficient dental service in the hospitals but are confronted with the facts that men competently trained to fulfill that service are exceedingly scarce and hence provision must be made for their training. The preparation of skilled men will not alone solve the problem for the service of such skilled men is not as yet understood and appreciated. There must be much general education. We recommend that a systematic educational bureau be conducted by this society as soon as its organization will permit.

Respectfully submitted,
Weston A. Price, *Chairman.*
H. C. Kenyon
H. R. C. Wilson.

REPORT ON THE RESEARCH INSTITUTE OF THE NATIONAL DENTAL ASSOCIATION*

To the Members of the Ohio State Dental Society:

In response to the many inquiries regarding the Research Institute I make the following report:

The Trustees of the Institute have voted to lease the property in Cleveland, and have provided that the income will be expended under grants for dental research by the Research Commission of the National Dental Association. This action has been taken because of a lack of co-operation in carrying out the provisions which created the Institute.

The Institute has been as a child born out of due time, for its existence and development have been opposed from the very first. The writer believes that this lack of co-operation constitutes the saddest page in all of dental history, first, because it has prevented the National Dental Association from securing an institution which would be in efficiency for the dental profession what the Rockefeller is for general medicine and, second, because we as members of the dental profession have a responsibility which is so out of proportion to the effort we are making to meet it. Humanity is cursed with the direct and indirect effects of dental disease, the very obscurity of which makes its members helpless. The members of our profession are demanding that they are the logical and competent interpreters of these relationships. We not only do not know the answers to the questions involved but, sadder still, are making relatively little effort to find them out. What is one dollar per year in proportion to the responsibility of each—perhaps one hundredth of one per cent of the profession's income? The profession of another day will look back to this as the age when the blind were leading the blind. What, for instance, do we know today as to what constitutes a safe tooth and an unsafe one?

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* Presented at the Ohio State Dental Society, December 2nd, 1920.

The following is a copy of the official report to the National Dental Association and the Research Commission.(*)

Respectfully submitted,
WESTON A. PRICE,
President and Managing Director.

(*) NOTE.—The Publication Committee of the Ohio State Society decided that the publication of the detailed report belonged to the National Dental Association. Accordingly, for the official report referred to, see the proceedings of the National Dental Association for the 1920 meeting at Boston.

DEPARTMENT OF DENTAL SURGERY CLEVELAND CITY HOSPITAL

June 6, 1921.

Editor DENTAL SUMMARY:

In your May, 1921 issue, in an article by Dr. H. L. Ambler, page 432, appears the statement that the Fairview Park Hospital Nurses Training School is the only one in Cleveland presenting a complete course in dental pathology and mouth hygiene.

This statement is untrue and casts an undeserved reflection upon the Nurses Training School of the City Hospital of Cleveland. In this school the girls in training not only receive a systematic course of lectures on dental subjects, but regular practical instruction and experience in the dental clinic and on the wards by the dental staff of the hospital.

So far as we know this is the only hospital in Cleveland which puts dental training for nurses on the same basis as the other subjects of the curriculum by requiring the students to pass a regular examination by the head of the department of dental surgery as a condition of graduation.

Very truly yours,
H. C. KENYON.

FUNDAMENTALS OF OPERATIVE DENTISTRY

BY W. H. O. McGEHEE, M.D., D. D. S., CLEVELAND, OHIO

LATE PROFESSOR OF OPERATIVE DENTISTRY, DENTAL PATHOLOGY AND THERAPEUTICS, AND SUPERINTENDENT OF CLINICS IN THE DENTAL SCHOOL OF WESTERN RESERVE UNIVERSITY.

VITAL RESISTANCE OF TEETH—DIAGNOSIS OF PULP DISTURBANCES TREATMENT OF NON-VITAL PULPS

VITAL RESISTANCE OF TOOTH STRUCTURE

WHEN THE PULP loses its vitality, or is removed for any cause, the enamel and dentin probably are deprived of their source of nutrition, and become dead structures. This, however, is not true of the cementum, which still receives nourishment from its lining membrane, the pericementum, and thus retains its vital connections with the supporting tissues. It may thus be seen that the phrase, "dead tooth," is a misnomer, and, in the majority of instances, should not be used, since it is frequently liable to lead to a misconception of the functions and capacity for continued usefulness of a pulpless tooth. Vital teeth are capable of offering a certain amount of resistance throughout their periods of usefulness, to the inroads of pathologic processes. The following evidence is offered in support of this statement, viz.:

First, the pulp is the formative organ of the dentin, and, after tooth formation is complete it remains to furnish nourishment via the dentinal tubules to this structure. The dentinal fibrils are bathed in a serous exudate of living protoplasm, which is exuded from the trophic pulp. On the life of the pulp depends the existence and welfare of the teeth.

Second, the dentinal fibrils in some instances extend into the enamel. This is considered by some as an abnormality, but the condition is found frequently enough to be taken into consideration.

Third, when the tooth is subjected to abnormal influences, such as caries, abrasion, erosion, and other similar conditions, the pulp responds in the form of a vital impulse and interposes a wall of resistance against the attacking agencies in the form of a transparent zone, tubular calcification or secondary dentin. Hypersensitive dentin is also the result of vital action.

Fourth, these phenomena are never found in pulpless teeth.

Fifth, clinical evidence demonstrates that devital teeth decay more rapidly than vital ones. The dentin loses its strength, elasticity and translucency.

Sixth, when the pulp of a tooth is removed for any cause, the enamel is much more subject to cracks, fractures, splitting off from the surface of the dentin, and rapidly progressing caries.

Seventh. the enamel, dentin, and cementum are capable of staining, either from within or without, by staining reagents, and the rapidity of staining is much greater in dead than in living teeth. The enamel is slightly receptive to staining agents when vital, but much more so when non-vital.

Eighth, Causch, Von Buest, Boedecker, Heintzman, Klein, Tomes, Abbott, Von Ebner, Andreson, Morgenstern and others demonstrated the presence of living protoplasm in various forms in the enamel, indicating that this substance is not completely out of the pale of nutrition.

Ninth, Woods, Causch, Miller, Kirk, Gaskill, Hopewell-Smith, Burchard and others have reported cases of resorption of the enamel and dentin from within, via the pulp, which could occur only through vital action. In some of these cases the resorbed areas have later been filled in by new depositions, via the pulp.

Tenth, in pregnancy, rickets, osteomalacia, and similar conditions, the bones and teeth are subject to retrograde metamorphosis and absorption of their contained lime salts, via the blood stream. The teeth are markedly more subject to caries in these conditions.

Eleventh, in sickness, convalescence, lowered vitality from any cause, the teeth are more subject to decay, regardless of the regular hygienic care which may be given them. The condition is due in many instances, especially in rickets, osteomalacia, gout, and diabetes, to the fact that not only is the resistance of the vital protoplasmic contents of the teeth lowered, but also that in these conditions there is an excess of ammonium chlorid formed in the blood, which, reaching the vessels of the pulp, produces a dissolution or softening of the hard tissues of the teeth.

Twelfth, Black to the contrary, Pickerill and others have demonstrated a change with age, in the amount of calcium salts in the enamel, as well as a marked difference in the total amount in all of the tooth tissue in the so-called hard and soft teeth. This necessarily must be due largely to vital functions or activities.

It may thus be perceived that it is important to maintain the vitality of the pulp in every instance where this is possible. However, its removal, as previously stated, does not necessarily result in the leaving in position in the mouth of a dead organ, since vital relationships are still maintained by way of a peridental membrane. A non-vital tooth is not then a menace *per se*, to the health of the individual, if it be given proper treatment, through the thorough removal of all septic material, and if the canals be hermetically sealed against the entrance of infection from without or through the apical foramen. If these procedures be properly performed, a non-vital tooth (so-called) may, in the majority of instances, be restored to prolonged periods of usefulness. It is true that its vital resistance, as far as the enamel and dentin are concerned, is probably lost, that it is more subject to caries, fractures and other pathologic disturbances, and that it is not capable of subjection to the excessive stresses to which vital teeth are subject; but in this condition it is usually a far superior functioning piece of mechanism than is an artificial substitute. Consequently, every effort should be made to retain teeth of this character for obvious reasons. Too much stress, however, cannot be laid on the importance of the removal of all infection, through proper sterilization and thorough filling of the root canal, on account of the danger of infections arising later in the apical space and producing a local focus, which may subject the patient to grave systemic disturbances. This phase of the subject will be more fully discussed in a subsequent chapter.

488. In case *Death* of the pulp occurs without the entrance of germs, what condition is produced?

Dry gangrene, in which the pulp remains as a dry, shrivelled mass, insensitive, unaffected by temperature changes, and likely to cause discoloration of the tooth. The condition may continue for an indefinite time without symptoms, but is a menace, on account of the danger of entrance of germs and the production of moist gangrene, with subsequent alveolar abscess.

489. What is the *Treatment of Dry Gangrene* of the pulp?

The treatment consists in its removal, under aseptic precautions, with immediate root filling; or, after removal, of the sealing in the canals for a few days of cotton containing a bland antiseptic, such as phenol compound or five per cent. formalin solution, following which they are ready for filling. As a precautionary measure, filling usually should be postponed until a second sitting.

490. Why is a knowledge of the *Chemistry* of putrefactive decomposition of the pulp important?

In order that the chemical changes taking place and the new chemical compounds being formed during its progress may be known, so that the proper remedies may be intelligently and rationally applied in the treatment of the condition.

491. What is the *Chemical Composition* ot normal pulp tissue?

First, proteids or albuminous substances, containing principally the elements, C, H, O, N, S and Fe in their molecule, and which break down or are destroyed through the process of *putrefaction.*

Second, carbohydrates, containing C, H, O in their molecule; always six atoms of C or multiples of six, with H and O in proportion, to form water. These substances are broken down through the process of *fermentation.*

Third, fats; principally palmitin, olein and stearin, containing C,H,O in various proportions, which are decomposed through a process of *saponification* by alkalies, or *ferment* in an alkaline medium.

492. What condition is necessary to the production of *Moist Gangrene,* or putrefactive decomposition of the pulp?

The entrance of putrefactive germs, either through an open cavity, from a layer of imperfectly-removed infected dentin, via exposed dentinal tubules, a leaky filling, or through the circulation.

493. In a *Study of the Chemistry* of putrefactive decomposition of the pulp, with what special constituents of the organ are we concerned?

With the proteids and fats, since the carbohydrate material does not putrefy. The terms of putrefaction, acting on the above unstable compounds and breaking them down (an analytic process) into new compounds of simpler nature, first form certain *intermediate products*, and finally resolve them into certain *end products* of a still simpler molecular composition.

494. Describe briefly the *Intermediate Products* formed.

First, ptomaines or animal alkaloids, of which putrescin, cadaverin and neuridin are the principal ones. NH_3 or derivatives of ammonia are later formed from all of these. Neuridin is almost harmless, but the other two, if forced through the apical foramen, produce inflammation, suppuration and abscess formation in the tissues of the apical space.

Second, amido-acids, the principal ones being tyrosin, and lucin. Ammonia and its derivatives are formed from these, and also fatty end products.

495. Mention the *End Products* formed.

H_2O, CO_2, $HC_2H_3O_2$ (acetic acid), NH_3, H_2S and a semi-putrid substance, largely fats. Of these substances, the most harmful are ammonia gas and hydrogen-sulphid, of which the former is present in much larger amounts.

496. Is the putrefactive process *confined* to the pulp chamber and canal?

The dentinal fibrillæ are broken up, as is also the hemoglobin and other constituents of the blood, with the result that the tubules also are filled with the intermediate and end products, as well as with coloring matters and other substances.

497. Describe *Buckley's Treatment* for putrescent pulp.

A Under aseptic precautions, establish the outline form, remove the decay and make the cavity retentive.

B Open the pulp chamber and remove the bulbous portion of the pulp.

C Seal into the pulp chamber, by means of base-plate guttaprcha or cement, on a pledget of cotton, a mixture of equal parts of formalin and cresol, known as formocresol.

D At the end of from twenty-four to seventy-two hours, take out the dressing under aseptic precautions, and remove the remainder of the pulp from the canals.

E Place in each canal, and also in the pulp chamber, cotton containing the formocresol mixture, and seal the cavity as before.

F After an interval of from twenty-four to seventy-two hours, remove the dressing under aseptic precautions, and, if all evidences of putrefaction are destroyed, fill the canals.

498. Tell what *Chemical Reactions* occur between the intermediate and end products and the formalin.

The formalin, liquor formaldehyd, unites chemically with them and forms new, odorless and non-infective compounds of a harmless nature. It also destroys the micro-organisms. Formalin unites with NH_3 and forms urotropin; also with H_2S forming methyl alcohol, a liquid, and sulphur. It also unites with the ptomaines, cadaverin, putrescin and neuridin, forming new, inodorous compounds. In this manner the two gases being formed in largest amounts and giving the most trouble, as well as the poisonous ptomaines, are transformed into non-irritating, non-poisonous liquids and solids.

499. Tell why *Cresol* is used and what *Effect* it has.

First, it is a good disinfectant, much stronger than phenol, thus destroying the germs and odors.

Second, it readily mixes with formalin in all proportions and makes a clear solution.

Third, it is anodyne and modifies the irritating effects of the formalin, being used for that reason, as well as from the fact that it dilutes the solution.

Fourth, it saponifies the fats and fatty acids, transforming them into antiseptic soaps.

TABLE SHOWING CHEMICAL CHANGES OCCURRING DURING PUTREFACTIVE DECOMPOSITION OF THE PULP AND ACTION OF FORMOCRESOL ON THE INTERMEDIATE AND END PRODUCTS

First, Chemical Composition of Normal Pulp Tissue.

A *Nitrogenous Compounds*	B *Non-Nitrogenous Compounds*	
Proteids or Albuminous Substances.	Carbohydrates	Fats
C,H,O,N,S (Fe-P)	C,H,O	C,H,O
(Putrefy)	(Ferment)	Palmitin
		Olein
		Stearin
		(Saponify or ferment in an alkaline medium)

Second, Intermediate Products.

(Produced by action of germs)

A *Ptomaines* (Animal alkaloids)	B *Amido-Acids* (Fatty Acids)
Putrescin	Tyrosin
Cadavarin	Leucin
Neuridin	

Third, End Products.

(Further action of germs).

H_2O, CO_2, $HC_2H_3O_2$, NH_3, H_2S, Fatty substances.

Fourth, Results of Action of Formocresol.

Formalin plus H_2S (hydrogen sulphid)=Urotropin.
Formalin plus NH_3 (ammonia gas)=Methyl alcohol and sulphur.
Formalin plus Ptomaines=Inodorous, harmless compounds.
Cresol plus fats=Antiseptic soaps.
Formocresol plus germs=sterilization and death of germs.
(The carbohydrate material is not considered).

500. What is the objection to the use of *Colored Drugs* during pulp treatment?

They stain tooth structure; fresh, chemically pure solutions of formocresol, phenol, volatile oils, creosote and similar agents should be clear solutions, and if they are not, they should be discarded, on account of the danger of staining, as well as because they are not efficacious.

501. What three *Important Considerations* should be constantly borne in mind during the treatment of putrescent pulps?

First, establish asepsis as early as possible.
Second, prevent recurring sepsis.
Third, preserve or restore the color of the tooth.

To accomplish these conditions the saliva should be excluded at once and never again be allowed to enter; all treatments should be hermetically sealed, and colored medicaments should be avoided.

502. Describe the method of treating moist gangrene of the pulp with *Sodium Dioxid* (Kirk's Method).

Sodium dioxid, NA_2O_2, introduced by E. C. Kirk, in 1893, is a yellowish-white powder, containing a large amount of oxygen, on which it depends for its efficacy. It must be handled very carefully, on account of the danger of an explosion, if brought near a flame or mixed carelessly with water. It is a strong caustic, hence the importance of preventing contact with the soft tissues. It is better handled with gold, platinum or glass instruments, on account of its corroding action on steel. The tooth should be isolated with a rubber dam and carefully ligated, the use of steel clamps being avoided on the tooth to be treated. A paste may be made by mixing the preparation with chloroform on a glass slab, to be carried into the pulp chamber and canals on broaches, preferably of gold or platinum; or a small amount of the powder may be laid on the glass slab and a few drops of water placed to one side. Then the broach may be moistened in the water, drawn quickly through the powder and instantly carried into the canals, when effervescence ensues, due to the oxidizing and destructive effect of the preparation on the organic contents. The procedure is repeated until all of the pulp tissue is burned out and the canals cleansed of their contents. Avoid forcing the preparation through the apex, on account of its caustic and irritating effects. In addition to saponification of the gangrenous pulp tissue and its detergent effect, bleaching of the tooth is accomplished. The preparation also, owing to its softening effect on the walls of canals, is valuable in enlarging small canals. The operation is repeated when, in some instances, the canals may be filled at once. In other cases an anodyne antiseptic dressing, or hydrogen dioxid, may be sealed in position and the sodium dioxid treatment repeated at a subsequent visit, if found necessary.

503. Describe the "*Open Treatment*" of putrescent pulp.

Open treatments have been largely abandoned, on account of the additional time required, their tendency to keep up the infection, to produce discoloration, and to dilute and neutralize the effects of the remedies employed, from the continued entrance of saliva. The contents of the chamber and canals are mechanically removed with broaches and similar instruments, when germicidal agents, such as creosote, phenol, camphophenique or Black's 1-2-3 are placed in the tooth, sealed with gutta-percha, and the sealing agent then perforated to allow for escape of the gases. In other cases, the cavity is packed with dry cotton, or cotton saturated with a varnish. The treatments are repeated at intervals until the case is deemed ready for filling.

504. Describe *Black's Method* of treating putrescent pulp.

Apply the rubber dam, establish the outline form, remove the decay, thoroughly open and remove the contents of the pulp chamber. Absorb any liquid contents of the canals with dry cotton on a smooth broach. Thoroughly broach out the contents of the canals with barbed broaches, sterilized with phenol, followed by alcohol. Continue the broaching and "rasping" process until the canals are open to the apex. Finally flood the canals with 1-2-3, or oil of cloves, and repeat the broaching, when the medicament should be absorbed away with dry cotton, and all loose particles removed in the same manner. Avoid forcing the contents of the canals through the apical foramen, on account of the danger of infection and abscess. Then seal a dressing of creosote or similar agent in the canals for several days. Repeat the procedure at subsequent sittings, until all odor and evidences of infection have disappeared, when the canals may be filled.

DIAGNOSIS OF PULP DISTURBANCES

The clinical manifestations of pulp disturbance are largely due to pathologic changes taking place in the vessels and vasomotor and sensory nerves of the part. As a result of the action of the irritants previously mentioned, transmitted by way of the dentinal fibrillæ, the vaso-motor nerves supplying the vessel walls are first stimulated, then over-stimulated and finally paralyzed. The same conditions result in the sensory nerves, with the result that in the early stages of pulp disturbance, arterial and venous hyperæmia (congestion) occurs from loss of tone in the vasomotor nerves supplying the vessel walls. The resultant dilatation of these walls produces lateral pressure on the sensory nerves immediately adjacent, with the production of pain. As the condition increases in degree, stagnation of the blood currents results from pressure on the afferent and efferent blood currents passing through the apical foramen (jugulation). At the same time, progressive, degenerative changes are occurring in the nerves of the part, with increased tendency to dilatation, loss of tone and rupture of the vessels, following which the condition of inflammation is fully established. This condition, long continued, finally produces complete paralysis of both sensory and vasomotor nerves, with ultimate death of the pulp, from loss of the functional activities of its vascular and nerve supply.

If suppurative changes occur, the pressure of the gases being formed in conditions of this nature is also productive of pain, so long as any vitality remains in the sensory nerves of the pulp. It may thus be seen that the pressure element is largely concerned in the production of the painful sensations manifested in diseases of the organ.

The terminal nerves of the pulp are not supplied with tactile endings, hence the organ has no sense of location. One of the chief characteristics of pulp disturbance is pain of a reflex nature—indefinitely located pain referred to an adjoining tooth or to distant parts.

The character and extent of the pain exhibited greatly assists in making a diagnosis of the pathologic disturbance present. Pulps are peculiarly susceptible to changes of temperature, since, as is well known, the application of cold produces contraction, while heat causes expansion of tissues richly endowed with a blood supply. The temperature tests (thermal tests) of G. V. Black and Louis Jack, devised years ago, are still of great value in making a diagnosis of pulp disturbances. The reactions to these tests may be outlined as follows, although the exact relationships between the pathologic changes taking place and the response elicited never have been thoroughly worked out:

First, teeth are normally accustomed to changes of temperature, ranging between sixty degrees and one hundred and five to one hundred and ten degrees Fahrenheit, and within this range, if the pulp be in a healthy condition, do not respond to these applications.

Second, if a jet of water at a temperature of forty degrees Fahrenheit be applied to a healthy tooth, the act is followed in a short while by a sharp contraction pain. Hot water will produce a similar response, viz., the normal pulp responds indifferently to either heat or cold.

Third, with the loss of enamel and dentin, through caries and other conditions, the reaction to thermal stimuli gradually increases in promptness until, when the pulp is nearly exposed, the response is immediate.

Fourth, as irritation of the pulp increases in amount from the constant actions of external agencies, there gradually arises prompt response to lesser and lesser degrees of temperature canhge, until the pulp finally responds to temperatures near 98.6 degrees Fahrenheit, viz., body temperature.

Fifth, the character of the pain elicited also changes from a sharp contraction pain in the early stages of pulp disturbance to a heavy throbbing pain as the condition progresses. Still later, the pain will frequently manifest itself without apparent source of irritation, or on assuming the recumbent posture.

Sixth, in suppurative conditions of the pulp, intense pain frequently is manifested from applications of heat, while cold relieves.

Seventh, still later, after paralysis of the sensory nerves of the pulp has occurred and death of the organ has taken place, no response is elicited, even by prolonged application of a spray of ethyl chlorid, although prolonged application of intense heat may cause a response, from expansion of the gases of putrefactive decomposition.

Eighth, in the constructive diseases of the pulp, viz., tubular calcification, secondary dentin, pulp nodules and calcareous degeneration, response to applications of heat and cold is usually increasingly delayed with the progress of the disturbance, with the result that, in cases of this nature, it is frequently only after prolonged application of intense heat or cold that a response is obtained.

TESTS FOR PULP VITALITY

None of the tests for vitality of the pulp are absolutely infallible. The only sure test is entrance into the pulp chamber and direct contact with the contents of the chamber and canals. However, the procedures herewith given will be of assistance in making a diagnosis.

First, transillumination of the tooth by means of an electric mouth lamp. A vital tooth will appear translucent and pink, while a non-vital one will be opaque and often clouded to a gray or bluish-black color. Discoloration and darkening of the tooth are characteristic of non-vital teeth, although in many instances these phenomena are absent.

Second, prolonged application of iced water or ethyl chlorid will elicit no response from a non-vital tooth.

Third, application of a hot burnisher or hot gutta-percha or water will be negative as far as pain production is concerned.

Fourth, application of the mild electric current will produce a response from a vital pulp, while none will be obtained in non-vital cases.

Numerous types of electric pulp-testing apparatus may now be obtained for this purpose. In using them one electrode is placed in contact with the suspected tooth, while the other is held by the patient, or is placed in contact with the wrist or some other part of the body. The current is now turned on and gradually increased in amount. A dead tooth will not respond to the strongest current of which the machine is capable, while a vital tooth will respond with varying degrees of intensity, depending on the susceptibility of the individual and the state of health of the pulp tested, the teeth of some patients responding more readily than others, and diseased vital pulps responding more or less readily, depending on the pathologic condition present.

In testing vital pulps for the presence or absence of pathologic disturbances, the following procedures may be followed: Apply the current to several known vital teeth, until a tingling sensation is felt, but not until pain is produced. The average current necessary to produce this sensation is termed the *irritation point.* After having established on the machine the irritation point for the patient, it is now a simple matter to distinguish diseased from normal pulp reactions. The following reactions will be of value in determining the probable condition present:

First, a normal pulp will respond to the current at the irritation point.

Second, an irritated pulp will respond at or just below the irritation point.

Third, an inflamed pulp will respond below the irritation point, the greater the degree of inflammation present, the more ready the response.

Fourth, a suppurative pulp will respond above the irritation point, the more severe the suppurative condition, the less ready the response.

Fifth, a devital pulp will give no response whatever to the full strength of the current.

DIAGNOSIS OF ARTERIAL HYPERÆMIA

It has been stated several times in this work that pulps which have not passed beyond the stage of arterial hyperæmia frequently may be restored to health and, in cases of exposure, subjected to the pulp-capping operation. For diagnostic purposes the symptoms of arterial hyperæmia may here be mentioned as follows:

First, intermittent, not continuous pain, of recent origin, of a lancinating character, indefinitely located, is characteristic. The pain may arise in the absence of tangible external sources of irritation, and, being of a reflex nature, may be referred to an adjoining tooth, to the gum, to the eye, to the ear and other distant parts.

Second, application of mild degrees of cold or heat usually produces a quick, sharp contraction pain, passing away immediately and not reappearing. A blast of air from the chip blower usually is sufficient to produce the above characteristic response.

Third, the application of the electric test usually produces a response slightly below the irritation point.

EDITORIAL

THE SOCIETY PROGRAM

A good program is a most desirable feature of any society session but it is no easy task for a program committee to supply one year after year that will interest the majority of members in attendance. It usually falls upon one or two or three persons to prepare the program and just what subjects to include that will prove most beneficial is a difficult matter. More difficult now than it was before the field of dentistry expanded to include so many phases of practice and intricate problems now receiving consideration.

And yet it is necessary to construct a program for any society meeting that will be of enough interest and importance to bring a good attendance.

Many of the local societies are barely existing because the majority of subjects presented for discussion are not of enough interest and importance to attract a full attendance of the members. Few societies, particularly local societies seem to be presenting the quality of material the members are capable of giving that would keep up the attendance and interest in the meetings.

Why this is so we do not know, but we do know that the person or persons having a program in charge should not put off until the last minute the assignment of a topic to be presented at any meeting, nor should the one who is to read the paper postpone the writing of it until "the night before the meeting." More thought given to the subjects most suitable for presentation and a more thorough discussion than is often given to the subject under consideration, would add greatly to the interest of many a meeting.

Of course it means some work and an expenditure of time but every member should at all times be ready and willing to do his share for the benefit of his associates.

And yet a chairman or a few constituting a program committee may be so faithful in their efforts and still not succeed in selecting just the subjects that will interest the majority of the members.

At the recent meeting of the Indiana State Dental Association, printed lists of some twenty-four topics were handed the members for a first, second and third choice of subjects to be presented at the next annual meeting. These are printed in this issue of THE SUMMARY in an article by Dr. Earl Brooks entitled, "The Trend of Thought in Indiana."

This procedure seems to be an excellent idea and should prove a great relief from some of the responsibilities now assumed by a program committee. It is applicable to the small as well as the large society and should result in an increased interest in the meetings and greater attendance at the sessions.

NATIONAL DENTAL ASSOCIATION ANNOUNCEMENTS

STUDY · PUBLISH · RECORD

PRELIMINARY PROGRAM OF THE SCIENTIFIC SESSIONS

OPERATIVE DENTISTRY, MATERIA MEDICA AND THERAPEUTICS

OFFICERS OF THE SECTION

Harold S. Smith, Chairman, Chicago, Ill., 1010 Belmont Ave.

J. H. Phillips, Vice-Chairman, Nashville, Tenn., 2117 Blair Bldg.

Roscoe H. Volland, Secretary, Iowa City, Ia.

Tuesday Afternoon, August 16

2:00 p. m. to 4:00 p. m.

(Plankinton Hall, Auditorium)

This section will present seven papers and five unit clinics. Three papers will be read Wednesday morning and two Thursday morning and the clinics demonstrating them will follow in the afternoons of same days, under the direction of the essayists:

"Fundamentals of Cavity Preparation."

By R. R. Byrnes, Atlanta, Ga.

"The Greatest Need in Dentistry, the Dental Care of Children."

By Thomas B. McCrum, Kansas City, Mo.

Wednesday Morning

9:00 a. m. to 12:00 m.

(Plankinton Hall, Auditorium)

"An Amplified Technic Making Cohesive Gold a Comparative Pastime."

By Charles Southwell, Milwaukee, Wis.

"Wax Patterns for Cast Gold Inlays."

By Roscoe H. Volland, Iowa City, Iowa.

"The Cast Inlay Restoration."

By George M. Hollenback, Los Angeles, Calif.

Wednesday Afternoon

2:00 p. m. to 4:00 p. m.

(Arena, Auditorium)

CLINICS:

"An Amplified Technic Making Cohesive Gold a Comparative Pastime."

By Charles Southwell and six assistants.

University of Iowa Cast Gold Inlay Clinic:

1. "Cavity Preparation."

By Roscoe H. Volland, Iowa City, Iowa.

2. "Investing Wax Pattern."

By J. V. Blackman, Iowa City, Iowa.

3. "Dissipating Wax Pattern."

By G. O. Nichols, Iowa City, Iowa.

4. "Casting Inlays."

By Erling Thoen, Iowa City, Iowa.

"The Cast Inlay Restoration."

By George M. Hollenback, Los Angeles, Calif.

Thursday Morning

9:00 a. m. to 12:00 m.

(Plankinton Hall, Auditorium)

"Root-Canal Technic."

By J. F. Biddle, Pittsburgh, Pa.

"Radiographic Studies of Cases Following Pulp Treatment and Chronic Alveolar Abscesses"

By Frank W. Hergert, Seattle, Wash.

Thursday Afternoon

2:00 p. m. to 4:00 p. m.

(Arena, Auditorium)

CLINICS:

"Root-Canal Technic."

By F. J. Biddle and assistants, Pittsburgh, Pa.

"Radiographic Studies of Cases Following Pulp Treatment and Chronic Alveolar Abscesses"

By Frank W. Hergert, Seattle, Wash.

FULL DENTURE PROSTHESIS AND PARTIAL DENTURE PROSTHESIS

OFFICERS OF SECTION

Charles Lane, Chairman, Detroit, Mich., 1526 Woodward Ave.

Fred W. Allen, Vice-Chairman, Boston, Mass., 520 Beacon St.

William H. Elliott, Secretary, Detroit, Mich., 1539 Jefferson Ave., E.

We are sorry to report that no definite program has been furnished for publication from this section.

ORAL SURGERY, EXODONTIA AND ANESTHESIA

OFFICERS OF SECTION

John W. Seybold, Chairman, Denver, Colo., 304 Mack Bldg.

William L. Shearer, Vice-Chairman, Omaha, Neb., City National Bank Bldg.

J. P. Henahan, Secretary, Cleveland, Ohio, 1019 Rose Bldg.

Tuesday Afternoon, August 16

2:00 p. m. to 4:00 p. m.

(Arena Stage, Auditorium)

"The Surgical Management of Serious Focal Infection Cases When Caution Is to be Exercised and When Surgical Procedure is Indicated."

By T. A. Hardgrove, Fon du Lac, Wis.

"Tumors of the Jaws. Diagnosis and Treatment."

By N. N. Federspiel, Milwaukee, Wis.

WEDNESDAY MORNING
9:00 A. M. TO 12:00 M.
(Arena Stage, Auditorium)

"Differential Diagnosis and Treatment of Syphilis, Tuberculosis and Vincent's Angina."
By Edward H. Hatton, Chicago, Ill.
"Principles of Surgery, Modern Methods." (lantern slides)
By Bernard F. McGrath, Milwaukee, Wis.
"Clinical and X-Ray Examination of Mouth, Jaws and Antra with a Diagnosis of Findings."
By Virgil Loeb, St. Louis, Mo.

WEDNESDAY AFTERNOON
2:00 P. M. TO 4:00 P. M.
(Arena Stage, Auditorium)

"The Surgical Anatomy in the Field of Oral Surgery."
By D. M. Loughlin, Milwaukee, Wis.
"Cleft Palate and Harelip."
By William H. G. Logan, Chicago, Ill.

THURSDAY MORNING
9:00 A. M. TO 12:00 M.
Surgical clinics at hospitals

(There will be no surgical operations except by local surgeons who have hospital connections.)

THURSDAY AFTERNOON
2:00 P. M. TO 4:00 P. M.

"Physical Examination and Management of Anesthetic Complications."
By F. A. Thompson, Milwaukee, Wis.
"Conductive Anethesia, Technic and Management."
By C. W. Harned, Des Moines, Iowa.

FRIDAY MORNING
9:00 A. M. TO 12:00 M.

Surgical operations in hospitals

ORTHODONTIA AND PERIODONTIA

OFFICERS OF SECTION

Paul R. Stillman, Chairman, New York, N. Y. 52 Vanderbilt Ave.
W. C. Fisher, Vice-Chairman, New York, N. Y., 501 Fifth Ave.
John Oppie McCall, Secretary, Buffalo, N. Y., 434 Franklin St.

TUESDAY AFTERNOON, AUGUST 16
2:00 P. M. TO 4:00 P. M.
(Committee Room "A," Auditorium)

Address.
By Paul R. Stillman, New York, N. Y.
"Dento-Facial Deformities."
By B. E. Lischer, St. Louis, Mo.
"A Further Study in Compensatory Treatment for Missing Teeth."
By B. Frank Gray, San Francisco, Calif.
"A General-Purpose Orthodontic Appliance."
By William J. Brady, Kansas City, Mo.

WEDNESDAY MORNING
9:00 A. M. TO 12:00 M.
(Committee Room "A," Auditorium)

"The Making of Diagnosis and Prognosis of Periodontic Lesions."
By Elmer S. Best, Minneapolis, Minn.
"Some of the Essentials in the Treatment and Subsequent Care of the Investing Structures of the Teeth Beyond the Preventive Stage."
By Elbert J. Weaver, Milwaukee, Wis.
"Altering Abnormal Surface Wear."
By F. A. Bricker, Rochester, Minn.

WEDNESDAY AFTERNOON
2:00 P. M. TO 4:00 P. M.
(Committee Room "A," Auditorium)

"The Field of the Removable Appliance and the Blending of the Removable and Fixed Principles."
By Victor Hugo Jackson, New York, N. Y.
"Child Psychology in Orthodontia Practice."
By George F. Burke, Detroit, Mich.
"Treatment of Some Extreme Cases of Malocclusion and Dento-Facial Deformities After Developmental Period."
By A. C. Rohde, Milwaukee, Wis.

THURSDAY MORNING
9:00 A. M. TO 12:00 M.
(Committee Room "A," Auditorium)

"The Surgical Treatment of Periodontal Lesions."
By Justin D. Towner, Memphis, Tenn.
"Periodontic Response to Irritation."
By Newton G. Thomas, Chicago, Ill.
"Use of Special Instrument in Correction of Traumatic Occlusion."
By Tom Smith, Langdon, N. D.

MOUTH HYGIENE AND PREVENTIVE DENTISTRY

OFFICERS OF SECTION

E. L. Pettibone, Chairman, Cleveland, Ohio, 6503 Detroit Ave.
Justin D. Towner, Vice-Chairman, Memphis, Tenn., 1607 Central Bank Bldg.
C. H. Schott, Secretary, Cincinnati, Ohio, 1004 Neave Bldg.

TUESDAY AFTERNOON, AUGUST 16
2:00 P. M. TO 4:00 P. M.
(Juneau Hall, Auditorium)

Lecture for Normal School Students Illustrated by charts.
By G. D. Edgar, Defiance, Ohio.
Lecture Outlines Developed by the First and Second District Dental Societies of New York.
By Thaddeus P. Hyatt, New York, N. Y.
"Industrial Dentistry."
By Henry L. Banzhaf, Milwaukee, Wis.
(Dr. Banzhaf has an original idea of conducting an industrial dental dispensary.)

4:15 P. M.

Industrial Dental Surgeons' Meeting.

This lecture will be followed by a meeting of the National Association of Industrial Dental Surgeons in this room. All interested in industrial dentistry are invited to be present.

WEDNESDAY MORNING
9:00 A. M. TO 12:00 P. M.

(Juneau Hall, Auditorium)

"Contour Brushing."

By Henry Barnes, Cleveland, Ohio.

"A Modern Method of Financing Mouth Hygiene Dispensaries."

By Harris R. C. Wilson, Cleveland, Ohio.

"The McDowell County, West Virginia, Pre-School Dental Clinic and School Dental Clinic as Established and Maintained by the Tax Levy."

By G. T. Epling, Welch, W. Va.

THURSDAY MORNING
9:00 A. M. TO 12:00 M.

(Juneau Hall, Auditorium)

"Mouth Hygiene Lecture to School Children."

By Sidney J. Rauh, Cincinnati, Ohio.

(Dr. Rauh will demonstrate teaching of mouth hygiene.)

"Mouth Hygiene Lecture for High-School Pupils and Adults," (illustrated by lantern slides).

By E. S. Braithwaite, Willard, Ohio.

"Preventive Initial Preparation of All Mouths"

By H. G. Morton, Milwaukee, Wis.

General discussion of all papers.

THURSDAY AFTERNOON AND FRIDAY

(Arena, Auditorium)

CLINICS:

"Contour Brushing."

By Henry Barnes, Cleveland, Ohio.

"The Cleveland Mouth Hygiene Dispensaries"

By Harris R. C. Wilson, Cleveland, Ohio.

Ten Clinics.

By Wallace Seccombe and his associates, Toronto, Ont., Canada.

HISTOLOGY, PHYSIOLOGY, PATHOLOGY, BACTERIOLOGY AND CHEMISTRY (RESEARCH)

OFFICERS OF SECTION

Weston A. Price, Chairman, Cleveland, Ohio, 8926 Euclid Ave.

R. H. Volland, Vice-Chairman, Iowa City, Ia.

Harris R. C. Wilson, Secretary, Cleveland, Ohio, 701 Schofield Bldg.

TUESDAY AFTERNOON, AUGUST 16
2:00 P. M. TO 4:00 P. M.

(Englemann Hall, Auditorium)

STRUCTURE AND DEVELOPMENT OF DENTAL TISSUES

"The Histology of Dentin and the Contents of the Tubuli."

By C. B. Bodecker, Berlin.

(A) "A Classification of Oral Manifestations of Systemic Disease According to Type."

(B) "A Report of the Laboratory Findings of Twenty-five Cases of Infantile Scurvy, or Barlows' Disease."

By Harry Block, St. Louis, Mo.

WEDNESDAY MORNING
9:00 A. M. TO 12:00 M.

(Englemann Hall, Auditorium)

LOCAL AND SYSTEMIC EXPRESSIONS OF DENTAL INFECTIONS

"Elective Localization of Bacteria Isolated from Infected Teeth."

By John G. Meisser and Boyd S. Gardner, Rochester, Minn.

"Studies of the Vital Processes of Bacteria."

(A) Salt Antagonisms.

(B) Surface Tension Influences.

(C) Immunizing Properties of Bacteria Grown Under Different Conditions.

By W. P. Larson and Thomas B. Hartzell, Minneapolis, Minn.

"Etiology and Pathology of Glomerulo Nephritis."

By E. T. Bell and Thomas B. Hartzell, Minneapolis, Minn.

"Researches on Fundamentals Underlying Dental Diagnosis."

(A) Determinations of the Amount of Dental Infection Necessary to Produce Systemic Disturbance.

(B) The Effect of Toxins Contained in Infected Teeth in Producing Sensitization of Special Body Tissues to Infections from Those Teeth.

(C) Relationships Between Local and Systemic Expressions of Dental Infections.

By Weston A. Price, Cleveland, Ohio.

WEDNESDAY AFTERNOON
2:00 P. M. TO 4:00 P. M.

(Englemann Hall, Auditorium)

DEMONSTRATION CLINIC:

(A) Exhibit of Specimens, Pictures, and Slides.

By Boyd S. Gardner and John G. Meisser, Rochester, Minn.

(B) Exhibit of Specimens, Pictures and Slides.

By Thomas B. Hartzell, W. P. Larson and E. T. Bell, Minneapolis, Minn.

(C) Motion Pictures Showing Comparison of the Lesions in Patients and Those of Animals Innoculated with Cultures from the Patient's Dental Focal Infections, Also Showing Sensitization Effects.

By Weston A. Price, Cleveland, Ohio.

THURSDAY MORNING
9:00 A. M. TO 12:00 M.

(Englemann Hall, Auditorium)

STRUCTURAL CHANGES IN DENTAL TISSUES

Supporting Structures.

"Further Studies of the Effect of Diet upon the Teeth and Jaws."

By Percy R. Howe, Boston, Mass.

Enamel and Dentin.

"Report of Research upon Saliva."
By John A. Marshall, San Francisco, Calif.
"The Etiology of Dental Caries."
By F. Bodecker, Berlin.

GENERAL AND UNIT CLINICS

Classified by States
(Arena, Auditorium)

OFFICERS

Adolph Gropper, Chairman, Milwaukee, Wis.

(All these clinics will be held in the Arena. There will be four half-days of clinics—Wednesday and Thursday afternoons and all day Friday. All section clinics, except the section on full Denture Prosthesis and Partial Denture Prosthesis will be held in the Arena with the General Session clinics.)

ALABAMA

Charles G. Dillard, Director, Huntsville.
"Dental Radiographs."
By Charles F. Chandler, Montgomery.
"Prophylaxis and Pyorrhea."
By Charles B. Fowlkes, Birmingham.
"Pyorrhea."
By H. C. Hassell, Tuscaloosa.
"Inlays."
By Charles G. Dillard, Huntsville.
"Fixed Bridge-Work on Vital Abutments."
By R. J. Monette, Birmingham.
"A Form of Fixed Sanitary Bridge on Vital Abutments."
By J. R. Rutland, Montgomery.
"Conductive Anesthesia."
By J. A. Blue, Birmingham.
"Removable Bridge-Work."
By J. B. Brothers, Birmingham.
"Artificial Dentures."
By A. K. Parks, Montgomery.
"Orthodontia."
By F. F. Perry, Montgomery.
"Pyorrhea."
By Olin Kirkland, Montgomery.

CALIFORNIA

Frank C. Pague, Director, San Francisco.
"Cast Partial Dentures."
By James Allen Graham, San Francisco.
"Porcelain Jacket Crown Technic."
By Hugh Avary, San Francisco.
"Compensatory Treatment for Missing Teeth."
By B. Frank Gray, San Francisco.
"Surgical Preparation of Mouths for Full Dentures."
By William A. Colburn, San Francisco.

GEORGIA

Harry B. Johnston, Director, Atlanta.
Root-Canal Section (Group).
Atlanta Clinic Club.

ILLINOIS

Victor H. Fuqua, Director, Chicago.
"Combination of Vulcanite and Metal Full Dentures."
By W. H. Kubacki.
Roscoe W. Upp, Chicago.
"Record System and Findings in Examination of 15,231 Employees at International Harvester Company Dental Department."
By Robert I. Humphrey, Chicago.
"Dentistry: A Phase of the Health Program for a Suburban Public School."
By Earl E. Graham, Lake Forest.
"Prophylaxis."
By Lester F. Clow, Chicago.
"Removable Dentures."
By Polk E. Akers, Chicago.
"Reducing the Possibility of Error in X-Ray Diagnosis."
By Charles U. Hillweg, Chicago.
"Large Gold Castings Using a Vulcanite Flask."
By Oliver J. Graham, Chicago.
"Impression Taking."
By John H. Hospers, Chicago.
"Full Denture Construction."
By Lester N. Roubert, Chicago.

"The Use of the Microscope in Dentistry. Illustrating Embryology, Histology, Pathology, Bacteriology, Photomicrography, Micro-Chemistry and Metallurgy."
By Vida A. Latham, Chicago.
"X-Rays of Oral Surgery Cases."
By Earle H. Thomas, Chicago.
"Some Helpful Suggestions in Prosthesis."
By C. L. Snyder, Freeport.
"Use of Tin and Gold in Young Mouths."
By E. F. Hazell, Springfield.
"Absorbent Cotten and Dental Medicaments"
By Harry F. Lotz, Joliet.
"Artificial Denture Construction."
By Rupert E. Hall, Chicago.
"Root-Canal Technic."
By W. E. Snow, Chicago.

"An Easy Process in Gold Inlay Work, of Taking Wax Impressions, Carving Wax Model, Casting Gold Inlays; Pinlays, Pinlocks and Bridge Abutments; and How and Where to Use Them in the Conservation of Pulps."
By P. A. Pyper, Pontiac.
"Some Important Steps in Successful Denture Construction."
By V. P. Perisho, Streator.
"Lingual Bar and Clasps."
By H. F. Methven, Chicago.

"Removable Bridges Using Cast Clasps and Attachments for Vital Teeth."
By C. W. Peterson and H. L. Lindburg, Moline.

"Fixed Bridge Abutment Pieces, for Vital Teeth, Both Anterior and Posterior."
By R. E. MacBoyle, Chicago.

"Bridge Attachments to Vital Teeth from Operative Point of View."
By Victor T. Nylander, Chicago.

"Early Dental Operating Case with Pearl-Handled Instruments from Museum of Northwestern Dental School."
By W. L. Wylie, Chicago.
"Porcelain Jacket Crowns—from Start to Finish."
By Harris J. Frank, Chicago.

"Stone Removed from Sublingual Duct."
By Thomas White, Naperville.
"The Importance of Absolute Parallelism of Attachments in Modern Removable Bridge Work."
By H. M. Heggland, Chicago.
"Obtunding Sensitive Dentin in Cavity Preparations."
By W. T. Reeves, Chicago.
"A Method of Using Dowel or Diatoric Teeth for an All-Porcelain Crown."
By Harry J. Combs, Evanston.
"Exhibits of Photographs of Illinois State Dental Society."
By G. H. Henderson, Chicago.
"New Lubricant Used in Connection with Gutta-Percha Cones for Filling Root-Canals."
By L. H. Arnold, Chicago.
"Filling Root-Canals."
By Edgar D. Coolidge, Chicago; J. R. Blayney, Chicago; Robert E. Wilder, Evanston.
"Radiographs of a Compound Fracture of the Mandible, Together with Models and Splints Used in Reduction of the Fracture."
By A. E. DeRiemer, Chicago.
"Gold Inlay Technic Impression Method for Wax Patterns; Low Heat Wax Dissipation."
By Eugene Maginnis, Chicago.
"Construction of Full Dentures from Impression, Taking to Completion, Including the Carving and Staining of the Six Anterior Teeth."
By J. H. Kaplin, Chicago.

INDIANA

W. E. Kennedy, Director, Indianapolis.
"Full Dentures Showing Esthetics and Efficiency in Construction."
By M. M. House, Indianapolis; R. H. Hopkins, Indianapolis; H. A. Young, Indianapolis.
"Radiographic Diagnosis."
By Earl Brooks, Noblesville.
"Root-Canal Filling."
By Frank A. Hamilton, Indianapolis.
"Porcelain Jacket Crowns."
By J. L. Wilson, Indianapolis.
"Bridge With Pin Retention in Vital Teeth."
By R. M. Hubbard, Indianapolis.

KANSAS

J. F. Kerman, Director, Wichita.
"Kansas Kinks."
By George W. Frank, Arkansas City.
"Closed Mouth Impressions." (Impressions taken with mouth really closed.)
By E. J. Cutshaw, Phillipsburg.

"An Accurate Method of Pulp Canal Filling."
By J. Fremont Burkett, Kingman.

"Temporary Plate: Impression Taken and Denture Constructed Before Teeth Are Removed."
By W. A. Clement and C. M. Rose, Wichita.
"Technic for Three-Quarter Crown."
By Ralfrad Rothschild, Salina.
"Conservative Abutments for Live Teeth in Fixed Bridge-Work."
By Lester D. Mitchell, Arkansas City
"An Accurate Method of Securing an Inlay by the Indirect Method."
By George E. Weight, Wichita.
"Method of Root-Canal Filling."
By S. S. Noble, Wichita.

LOUISIANA

Thomas M. Terry, Director, New Orleans.
"Porcelain Gum Restoration."
By Edward B. Ducasse, New Orleans.

MINNESOTA

Elmer S. Best, Director, Minneapolis.

1. Anesthesia
2. Oral Diagnosis
3. Periodontia
4. Pediodontia
5. Oral Surgery
6. Orthodontia
7. Ceramics
8. Operative Dentistry
9. Prosthetic Dentistry

NORTH CAROLINA

F. L. Hunt, Director, Asheville.
"Short Bridges, Abutments, Fixed and Not Fixed."
By E. G. Click, Elkin.
"Various Uses of Synthetic Porcelain."
By D. B. Mizell, Windsor.
"The Advantages of Certain Technic in Carving Wax Models."
By J. A. McClung, Winston-Salem.
"Removable Bridge-Work, Using the Cast Clasps as Abutment Pieces."
By R. W. Malone, (?)

NORTH DAKOTA

W. E. Hocking, Director, Devils Lake.
"The Correct Technic for the Preparation of an Isotonic Anesthetic Solution; Also Demonstrating the Action of Non-Isotonic Solutions Upon the Blood, Muscles and Nerve Tissue Cells of Living Animals."
By Ira G. Nichols, Mandan.
"Importance of Occlusal Planes and Contact Points on Gold Inlays."
By George P. Jorgenson, Grand Forks.

RHODE ISLAND

Ira B. Stilson, Director, Providence.
"Complete Sterilization, Procedure and Technic in Exodontia and Oral Surgery."
By J. Stafford Conley, Providence.
"Amalgam Restoration."
By Frank P. Duffy, Riverpoint.
"Faulty Technic in Casting and Its Correction."
By J. Fred Keeley, Fall River.

SOUTH DAKOTA

"Some Features of Conductive Anesthesia."
By Ralph H. Fouser, Salem.

TENNESSEE

"Casting Two Abutment Pieces and Constructing Bars on Original Model."
By Joseph A. Gardner, Memphis.
"Porcelain Jacket Crowns."
By Carl W. Hoffer, Nashville.

"The Definite Surgery of Peridontal Lesions."
By Justin D. Towner, Memphis.

Texas

J. M. McMinn, Director, Dallas.
"Advocacy of Fixed Bridge-Work."
By J. P. Arnold, Houston.
"Porcelain Tipped Dummies (Not Final)."
By E. L. Knox, Dallas.
"Cast-Swedged Gold and Aluminum Bases in Full Denture Work."
By J. M. McMinn, Dallas.

Utah

Victor H. Sears, Director, Salt Lake City.
"Preparation of the Alveolar Ridges for Artificial Dentures."
By Ernest W. Browning, Ogden.
Victor H. Sears, Salt Lake City.

Wisconsin

Burlington County Dental Society

A. A. Marck, Director, Burlington.

AMALGUM UNIT

"Cavity Technic."
By O. H. Mills, A. J. Zimmer, W. E. Dunbar.
"Matrices."
By C. J. Reinardy, A. J. Ketterhagen, W. L. Dunkirk.
"Mixing and Packing."
By C. E. Bottomley, H. H. Newbury, M. T. Hueber.
"Carving and Finishing."
By W. L. Hassold, S. C. Goff, F. M. Kyburz.

Milwaukee County Dental Society

George P. Brenner, Director, Milwaukee.

DENTURE UNIT

"Impression Trays and Mixing Plaster Correct Proportions and Consistency."
By A. A. Jennings, C. J. Jane.
"Compound Technic, Full Upper and Lower."
By C. E. Gage, P. G. Hartz.
"Plaster Impressions and Casts in Spences Plaster and Calsilith."
By William Hopkinson, J. W. Lewis.
"Upper and Lower Cast Mounting on Articulator."
By Theodare Kuechle.
"Upper and Lower, Correctly Articulated, Carved, and Tin-foiled, Ready for Flask."
By V. A. Smith, C. T. Rosenbaum.
"Upper and Lower Properly Flasked Rubber Packed, Correct Vulcanization, etc."
By A. J. Richter, J. J. Ruhland.
"Re-fit Upper Denture."
By P. W. Rood.
"Exhibit of Practical Full Denture Cases."
By George P. Brenner.

PORCELAIN UNIT

(Jacket Crown and Porcelain Root Technic)
By H. M. Uebele, Director, Milwaukee.
"Root Preparation."
By H. F. Thiel.
"Impression Taking."
By F. W. Heinemann.
"Model Making."
By W. L. Seng.
"Burnishing."
By J. J. Wright.
"Porcelain Baking."
By H. M. Uebele.
"Baking Roots on Facings."
By A. C. Sandner.

GOLD INLAY UNIT

(Showing the Technic of Cavity Preparation, Pattern Making, Investing, and Casting)
H. G. Morton, Director, Milwaukee.
By T. L. Gilbertson, F. W. Heinemann, Harry P. Jahn, Harry G. Morton, W. H. Schaller, J. G. Schottler, C. M. Schwendener, N. E. Uelmen.

LOCAL ANESTHESIA UNIT

Roy S. Hopkinson, Director, Milwaukee.

Table No. 1

"Pharmacology."
By George W. Wilson, J. J. Wright.

Table No. 2

"Osteology."
By L. E. Washburn.
(Anatomical Landmarks Important in Local Anesthesia)

Table No. 3

"Topography."
By William Hopkinson.

Table No. 4

"Neurology."
By Edward C. Voelker.

Table No. 5

"Technic of Injections and Summary."
By Roy S. Hopkinson.

BRIDGE-WORK UNIT

M. H. Mortonson, Director, Milwaukee.
"Technic of Movable-Removable Bridge Construction."
By M. H. Mortonson, A. W. Brictson, E. W. Blaisdell, E. C. Wetzel, J. C. Mortonson, E. A. Steinhaus, F. J. Metzger, E. G. Kohlsdorf.

PARTIAL GOLD PLATE AND CAST CLASPS UNIT

O. G. Krause, Director, Milwaukee.
"The Complete Technic of the Cast Clasp, the Cast Plate, the Assembling of All Parts, and the Taking of Partial Impressions."
By P. W. Rood, M. E. Johnson, E. J. Liebstuck, J. W. Lewis, W. A. McFarlane, W. S. Griffiths.

PATHOLOGICAL LABORATORY UNIT

Earl Doyle, Director, Waukesha.
"Introductory Remarks Showing the Necessity of Using This Oft-Neglected Part of Our Dental Education."
"Technic of Obtaining and Sending Specimen to the Pathological Laboratory."
"Explanation of Laboratory Reports and Indication as to When Such Examination Should Be Made."
(Showing Microscopic Specimen)
By E. J. Weaver, Albert Wiebrecht, W. H. Schaller, N. E. Uelmen, H. M. Uebele, C. M. Schwendener, Elmer A. Steinhaus, E. C. Wetzel.

Racine County Dental Society

James G. Nelson, Director, Racine.

"Cast Attachments in Bridge-Work."

By Earl Caulkins, Racine; James G. Nelson, Racine.

Winnebago County Dental Society

OSHKOSH AMALGAM UNIT

By M. L. Christensen, Director, Oshkosh.

"Up-to-the-Minute Technic on Amalgam."

By J. F. Mortell, C. C. Norris, R. J. Chady, O. B. Hinz, J. J. Geary, G. A. Stratton, J. L. Bender, H. E. Gage.

TRANSPORTATION TO THE MILWAUKEE MEETING

Reduced fares will be available to members attending this meeting, from all parts of the United States except the territory of the New England Passenger Association which has refused to grant any reduction in fare.

Summer excursion tickets from principal stations in California will be on sale from June 15 to August 15, and from principal points in Nevada, Oregon, Washington and western British Columbia from June 1 to August 15, to Chicago, at approximately one and one-third fare for the round trip, with return limit three months from date of sale, but not later than October 31.

All other territory (except New England points) has granted to members, and dependent members of their families, a rate of one and one-half fare on the certificate plan. Full fare will be paid on going trip and certificate must be obtained from the agent at the time the ticket is purchased, these certificates to be presented to the indorsing officer at the place of meeting. Certificates which show the purchase of tickets on August 11-17 inclusive, when validated by joint agent at meeting, will be honored for return tickets at one-half fare, if presented to ticket agent not later than August 23, 1921.

Members from New England points may pay one-way fare to New England Passenger Association boundaries, and therefrom avail themselves of the certificate plan arrangements.

Committee on Transportation,
D. C. Bacon, Chairman

To Prevent Inaccuracy While Setting Up Teeth

When making a denture, inaccuracy often arises because the porcelain of the teeth, while setting them up, is harder than the plaster of the opposing model, wears it off, and this causes the tooth to occupy an incorrect position. This can largely and very easily be overcome by painting the opposing plaster teeth, before setting up, with shellac or iodin. As soon as the porcelain wears the plaster down it will show up in white spots and caution the dentist to be careful.—*F. Van Minden, Hettinger's Dental News.*

OBITUARY

DR. GEORGE B. MARTIN, FRANKFORT, INDIANA

AT HIS HOME, on Wednesday evening, June 1, 1921, of apoplexy, Dr. George B. Martin, aged 71 years and 10 days.

Dr. Martin was born in Michigan, near Bancroft, where he spent his early life and entered the practice of dentistry, in which he was actively engaged until three days prior to his death, when he suffered the stroke of apoplexy from which he died. He had enjoyed unusually good health for many years, but suffered from valvular trouble of the heart for a few months prior to his passing away.

Dr. Martin will be remembered by hundreds of dentists for the part taken by him in the first so-called "Taggart Case," at Washington, D. C., in protecting the profession against claims of royalty on the part of holders of a certain process patent having to do with the cast inlay. In the May, 1913, number of THE DENTAL SUMMARY, under the title, "Honor to Whom Honor Is Due," there appeared the following:

"Those who have read the decision in the Taggart case know that the final decision was based largely upon the testimony of two men, Dr. G. B. Martin, of Frankfort, Ind., and Dr. O. H. Simpson, of Dodge City, Kansas. Every dentist owes a debt of gratitude to these two men, for their untiring efforts toward the advancement of dentistry."

For the past fourteen years Dr. Martin had been in active practice at Frankfort. During that time he perfected his now well-known remedy for pyorrhea, and arranged for supplying the profession through The Ransom & Randolph Co.

Dr. Martin is survived by his wife, Georgie Rooker Martin, to whom he left his entire estate by will; by a sister, Mrs. Eva Baker, Bancroft, Mich., and by two brothers, J. Martin, of Bancroft, and E. H. Martin, of Royal Oak, Mich.

At Dr. Martin's request, his body was taken to his old home in Michigan for interment.

NEW LEGISLATION

NEW OHIO LAW LEGALIZING THE DENTAL HYGIENIST

84th General Assembly,
Regular Session, 1921.

DR. B. J. EMERY.

A BILL

To supplement sections 1320, 1321 and 1324 of the General Code, relative to the practice of dentistry in the state of Ohio by the enactment of supplemental sections to be known as sections 1320-1, 1320-2, 1321-2, 1321-3, 1321-4, 1321-5, 1321-6, 1324-1, 1324-2 and 1324-3.

Be it enacted by the General Assembly of the State of Ohio:

Sec. 1. That sections 1320, 1321, and 1324 of the General Code be supplemented by the enactment of supplemental sections 1320-1, 1320-2, 1321-2, 1321-3, 1321-4, 1321-5, 1321-6, 1324-1, 1324-2 and 1324-3 to read as follows:

Sec. 1320-1. No person shall practice as a dental hygienist in this state except a licensed dentist or one who has obtained a license from the state dental board to practice as a dental hygienist as hereinafter provided.

Sec. 1320-2. A licensed dental hygienist may practice in a dental office, public or private school, hospital, dispensary or public institution, provided such service is rendered under the supervision of a licensed dentist of this state; and provided further, that no dentist shall employ more than one dental hygienist in the conducting of his private practice.

Sec. 1321-2. Each person who desires to practice as a dental hygienist within this state shall file with the secretary of the state dental board a written application for a license, upon the form prescribed and verified by oath. Such applicant shall furnish satisfactory proof of being at least eighteen years of age, of good moral character, possessed of an education equivalent to completion of four years of a first grade high school of at least fifteen units, as defined in the school laws of this state; further such applicant shall present a diploma or certificate of graduation from a reputable school, as defined by the state dental board, for the training of dental hygienists; and further, such applicant shall pay the examination fee of ten dollars. Those successfully passing such examination as the state dental board shall prescribe, shall receive a certificate of registration entitling them to practice as hereinbefore prescribed. An applicant failing to pass the first examination shall be entitled to a re-examination at the next regular or special examination of the state dental board without an additional fee; for each additional examination thereafter the regular fee of ten dollars shall be paid.

Sec. 1321-3. The practice of a dental hygienist shall be limited to the removal by mechanical means only of calcareous deposits, accretions and stains from the exposed surface of the teeth and directly beneath the normal free margin of the gums.

Sec. 1321-4. All dental hygienists practicing in this state shall, on or before January 1st of each year, pay to the secretary of the state dental board a registration fee of one dollar and shall furnish such information as the board may require regarding their location, and the name of the licensed dentist or dentists under whose supervision they practice. The license of a dental hygienist, who neglects to pay the annual registration fee, as herein provided, may be revoked by the state dental board; but the board may, at its discretion, reinstate a delinquent licensee upon the payment of a fee of five dollars. The license of a dental hygienist shall be exhibited in a conspicuous place in the room in which said dental hygienist practices.

Sec. 1321-5. The state dental board shall determine what shall constitute a minimum curriculum for a reputable school for dental hygienists, and shall have the power to examine the course of study, equipment and all facilities to be found in any school for dental hygienists; no such school shall offer a course of less than thirty-two weeks of actual instruction.

Sec. 1321-6. The secretary of the state dental board shall keep a record of all dental hygienists in this state, together with location and supervising dentist.

Sec. 1324-1. The state dental board may issue a license without an examination to an applicant who furnishes satisfactory proof of being a graduate from a reputable school for dental hygienists of any state, territory or district of the United States, and who holds a license from a similar dental board having requirements not less than those of this state, provided no license shall be issued under this section unless authorized by the affirmative vote of all the members of the state dental board present at such meeting. Application for this privilege must be made out on the form prescribed by the Ohio state dental board, accompanied by a fee of ten dollars and a recommendation from the dental board of the state, territory or district of the United States in which the applicant has practiced.

Sec. 1324-2. The provisions of sections 1325, 1326 and 1327 for dentists shall apply with equal force, as far as applicable, to dental hygienists.

Sec. 1324-3. Any person practicing or attempting to practice as a dental hygienist in this state in violation of the provisions of this act shall be guilty of a misdemeanor and upon conviction thereof shall be subject to the same penalties provided for the illegal practice of dentistry. Any person employing a dental hygienist who has not complied with all the requirements of the Ohio statutes governing the licensing and practice of a dental hygienist shall be fined not less than one hundred dollars, and not more than two hundred dollars.

Approved by Gov. Davis, May 17th, 1921.

WEST VIRGINIA LAW LEGALIZING DENTAL CLINICS AND MOUTH HYGIENE INSTRUCTION IN THE PUBLIC SCHOOLS.

(H. B. No. 45)

BY DR. GEO. C. HOWARD, WEST UNION, W. VA.

An Act relating to mouth hygiene and the treatment of pupils in the public schools, the same to be section sixty-four-*a* of chapter two of the acts of nineteen hundred and nineteen, regular session.

Be it enacted by the Legislature of West Virginia:

That chapter forty-five of the code, as amended by section sixty-four of chapter two of the acts of one thousand nine hundred and nineteen, be amended and re-enacted by adding thereto section sixty-four-*a*.

Section 64-*a*. The board of education in any school district may, at its discretion, establish and maintain dental clinics or courses for teaching mouth hygiene; and may provide for and furnish treatment, if requested by the parent or guardian or deemed necessary by the board of education, of such children who have defective teeth or mouth conditions, and who shall be found by such board of education, or persons deputized for that purpose, to be unable otherwise to procure such treatment. Any expense incurred in connection herewith shall be paid out of the maintenance building fund of said district. Passed April 8th and to go into effect ninety days after date of passage.

TEXT OF DENTAL HYGIENIST LAW ENACTED IN WEST VIRGINIA

(C. S. for H. B. No. 485)

INTRODUCED BY DR. G. C. HOWARD, WEST UNION, W. VA.,

MEMBER HOUSE OF DELEGATES, W. VA., LEGISLATURE

An Act to provide for the licensing of Dental Hygienists and regulating the practice of same.

Be it enacted by the Legislature of West Virginia:

Section 1. Any registered or licensed dentists may employ assistants who shall be known as dental hygienists. Such dental hygienists may remove the lime deposits, accretions and stains from the exposed surfaces of the teeth and directly beneath the free margin of the gum, or administer preliminary or post operative treatment for any dento-surgical operation, or administer prophylactic treatment to teeth and gums, but shall not perform any other operation on the teeth or on any diseased tissues of the mouth. They may practice in the office of any registered or licensed dentist, under his direct supervison or in any industrial clinic, school clinic or state institutional clinic where they may practice under the general supervision of a registered or licensed dentist. The state board of dental examiners may revoke the license of any dental hygienist who shall perform any operation other than that permitted under the provisions of this section.

Sec. 2. No person shall enter practice as a dental hygienist in this state until he or she has passed an examination given them by the board of dental examiners of this state, under such rules and regulations as it may deem fit and proper to formulate. The fee for said examination shall be ten dollars, ($10.00), and any applicant failing to pass such examination shall be entitled to one additional examination without futrher cost. The fee for such re-examination after the first shall be five dollars, ($5.00). The said board of dental examiners shall issue certificates of ability to practice as dental hygienists in this state to those who have passed such examination; *provided, however*, that no person shall be entitled to such certificate unless they shall be at least eighteeen years of age, of good moral character, and shall be a graduate of a class "A" high school or its equivalent and a graduate of a training school for dental hygienists approved by state board of dental examiners, or where the applicant is not permitted to attend such school for dental hygienists which may be approved by said board, then said certificates shall be issued as herein provided, which shall entitle all those to practice as dental hygienists in this state who may possess all other requirements herein mentioned and pass the required examination.

Sec. 2-*b*. It is further provided that any person acting as an assistant to any licensed dentists in this state for two consecutive years or more previous to this bill becoming a law in effect shall be eligible to examination for dental hygienist without further requirements; *provided*, application for such examination be made within six months after the passage of this act.

Sec. 2-*c*. The examination of applicants shall be both practical and theoretical, as follows:

Practical Examination

Each applicant must bring a patient upon whose teeth tartar deposits can be distinctly seen. The patient must have at least twenty-four (24) natural teeth present in the mouth. No attempt must be made to cleanse the mouth previous to the examination.

The examination will consist of (*a*) scaling and polishing the teeth of this patient; (*b*) instructing the patient on the home care of the mouth, including instruction in the use of the tooth brush; (*c*) oral quizzing by the examiners.

The applicant must come provided with suitable instruments and accessories, including two tooth brushes, to perform the above mentioned operations.

Chairs, tables and cuspidors only will be furnished by the board.

Theoretical Examination.

(1) anatomy; (2) physiology; (3) dental histology; (4) bacteriology and sterilization; (5) dental caries and malocclusion; (6) oral prophylaxis.

Sec. 3. The board of dental examiners of this state may, at its discretion, without the examination as herein provided, issue its certificate to any applicant therefor who shall furnish proof satisfactory to said board that they have been duly licensed to practice as a dental hygienist in another state after full compliance with the requirements of its dental laws; *provided, however*, that their professional and preliminary education shall not be less than that required in this state, and that they have been in active practice at least two years previous to their application for certificate. The board of dental examiners may revoke the registration and license of any dental hygienist violating any provision of this act.

Sec. 3-*a*. Any person who shall practice as a dental hygienist without first having complied with the provisions of this act shall be guilty of a misdemeanor, and upon conviction thereof, shall be fined not less than fifty dollars ($50.00) and not more than five hundred dollars ($500.00), and may be imprisoned not more than thirty (30) days, or both, at the discretion of the court, to which fine shall be added the costs of the prosecution.

Sec. 3-*b*. Any person other than a regularly licensed dentist shall be said to be practicing dental hygiene within the meaning of this act, who shall remove deposits, accretions and stains from the exposed surface of the teeth and polish same, or who shall practice the use of escharotic drugs in or about the teeth, or who shall make dental examination of teeth and diagnosis of same.

Sec. 4. All acts and parts of acts inconsistent herewith are hereby repealed.

Passed April 29th and to go into effect ninety days from date of passage.

SOCIETY·ANNOUNCEMENTS

AMERICAN DENTAL LIBRARY AND MUSEUM ASSOCIATION

The fourth annual meeting of the American Dental Library and Museum Association will be held August 15th, at 3:00 P. M., and 17th, in the Auditorium, Milwaukee, Wisconsin.

At the first session the official business will be considered and a permanent constitution adopted.

The second session will be held on the 17th, at an hour to suit the convenience of the majority of members, when an interesting program pertaining to library and museum matters will be given.

The list of applicants for membership in the Association has exceeded our expectations and we trust that all those interested in dental libraries and museums will forward their applications as soon as possible.

The objects of the Association will be the fostering and creating of dental libraries and museums, at the same time bringing about a closer relationship among those interested in the making of dental libraries and museums.

One of the most important functions of the Association will be the means of exchange of dental literature and specimens. Under the exchange the following objects are in view: An exchange of library and museum duplicates, securing libraries, instruments, and specimens of retired or deceased dentists, securing distribution of transactions of dental societies, reprints of scientific papers, and reports of societies, for securing endowments of dental libraries and museums, supplying special information on rare works in single libraries, on library and museum management, technique, device, bindings, etc.

With a view to the further promotion of these objects, the Secretary invites all who have this work at heart to join the Association, either as a society, college, or individual member.

Membership: Any dental society, association, university, college or library, having a permanent home and a dental library. Any individual interested in dental literature, libraries or museums.

We desire informarion as to what collections have thus far been made or may be in contemplation, the purpose being to publish later a list of dental libraries and museum workers.

For further information and membership blanks kindly communicate with the Secretary.

A. F. ISHAM, President.
B. W. WEINBERGER, Sec'y.
40 East 41st Street, N. Y. C.

National Dental Association Meeting

Milwaukee, August 15 to 19, 1921, inclusive.

Milwaukee, metropolis of Wisconsin, famed from coast to coast for its homes, health, and hospitality, as well as for the fact that it is the greatest convention city in the middle west, will act as a great reception committee and hostess to the 8000 or more delegates, visitors, and guests, attending the twenty-fifth or Silver Anniversary Convention of the National Dental Association, on August 15 to 19, 1921.

Those who come to Milwaukee during the National Dental Convention are assured of a most interesting and entertaining visit, evidence of which is furnished in the fact that during 1920 the Badger Metropolis of nearly a half million persons played host and hostess to more than 200 convention bodies, ranging from county and state to national organizations.

Milwaukee's Auditorium, an ornate structure right in the heart of the city, erected at a cost of $1,500,000, will be the scene of the great gathering of representatives of the dental profession and its allied activities. The Auditorium, conceded without argument, to be the finest and most commodious, as well as the most conveniently arranged convention or exposition building in the world, covers an entire block within walking distance of the business district and hotels. The massive structure embraces within its expansiveness, six separate minor auditoriums under one roof, the smallest of which seats 300 persons, and the largest having accommodation for 10,000. Mechanics Hall, in the building in which the dental exhibit will be held, adds 46,000 square feet of floor space for exhibition purposes, making a total floor space for exhibits of 103,000 square feet.

Milwaukee's hotels, which have a national reputation for excellence and genuine hospitality, not forced by commercialism, but spontaneous because of the very nature of things, are making elaborate preparations to provide for the comfort, convenience, and pleasure of the thousands of guests who will register within their walls. With more than twenty hostelries of high standing, few cities are better equipped or capable of handling so many transients at one time. The respective houses are well ordered for entertaining the heavy business, tourist and convention traffic.

Management of the various hotels have already reported reservations for the convention in August, which is indicative of the fact that the entire country from coast to coast, and north to south, will have representation at the great Silver Anniversary gathering of one of the leading professions. The list of Milwaukee's leading hotels, the proprietors of which have given the convention committee full assurance of complete cooperation in providing for the thousands of visitors on August 15 to 19, are: Milwaukee Athletic Club, Mason and Broadway; Hotel Aberdeen, 909 Grand avenue; Hotel Blatz, East Water street, corner of

Oneida street; Hotel Carlton, Milwaukee street; Hotel Charlotte, 138 Third street; Hotel Gilpatrick, 223 Third street; Globe Hotel, corner Wisconsin and Cass streets; Hotel Juneau, 225 Wisconsin street; Hotel Marquette, 188 Wisconsin street; Hotel Maryland, 137 Fourth street; Hotel Martin, Wisconsin street; Hotel Medford, corner Third and Sycamore streets; Hotel Miller, Third street, near Grand avenue; Hotel Pfister, Wisconsin and Jefferson streets; Hotel Plankinton, West Water and Sycamore streets; Republican House, Third and Cedar streets; Hotel Randolph, 134 Third street; Schlitz Hotel, Grand avenue and third street; Hotel St. Charles, City Hall Square; Hotel Wisconsin, Third street, near Grand avenue.

The Association of Military Dental Surgeons of the United States

The Eighth annual meeting of the Association of Military Dental Surgeons will be held at Milwaukee, August 16-17, 1921.

G. H. Casaday,
Secretary-Treasurer.

Virginia State Dental Association

The fifty-second annual session of the Virginia State Dental Association will be held in the Jefferson Hotel, Richmond, Virginia, October 11th to 14th.

North Dakota State Board

The next meeting of the State Board of Dental Examiners will be held in Fargo, beginning at nine o'clock Tuesday morning, July 12. All applications must be filed with the Secretary at least ten days before the examination. For further information write W. E. Hocking, Devils Lake, N. D.

SPECIAL NOTICE
THE BONWILL MECHANICAL MALLET.
INFORMATION WANTED

For the purpose of forwarding a revival of foil fillings at the coming meeting of the National Dental Association in Milwaukee in August, will any dentist who has had experience in the use of the Bonwill Mechanical Mallet (now issued as the S. S. White Engine Mallet No. 3), and who knows the Bonwill technique in condensing gold foil with that instrument, kindly send his name and address to

Dr. Charles Southwell,
409 Goldsmith Building,
Milwaukee, Wis.

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THE J. M. NEY COMPANY
Hartford, Connecticut, U. S. A.

NEWS and OPINIONS

CONDUCTED BY G. E. HARTER

The best news for the month comes just as the preparation of this copy is begun: That there is a break in the ranks of the striking printers, and some of them, at least, seem to be growing tired of living on the charity of their fellows and are ready to go to work.

This strike is probably the least rational of all the foolish strikes that have taken place of late. There is not and never was the slightest justification for it. On the other hand, it had and has much to condemn it.

No direct question of wages entered into it. It was, on its face, a demand for a reduction in working hours from 48 to 44—and of course, a corresponding reduction in production; and this at a time when increased production at a correspondingly reduced cost, is most positively necessary if prices of the necessities of life ever are to return to normal, and when the prices of printing of all kinds are so abnormally high as to be almost prohibitive.

Employing printers, knowing very well that their customers had stood the last increase in prices that could be expected of them, having granted one demand after another, concluded that the endless exactions of the unions had gone far enough, and refused the demand. The result was the "walk out," which has become an old story by this time.

Of course, the reduction in working-hours amounted to the same thing as an increase in pay, since, had the demand been granted, employers would have had to pay time-and-a-half for the last four hours each week. I am told that this would have meant an increase of about 25% in the labor-cost of printing.

One of the anomalies of the strike is seen when it is known that printers employed on newspapers promptly accepted a forty-eight hour week. And it has been and is these newspaper men who have been sustaining the job-printers by contributing 10% of their wages each month for the support of the strikers and their families.

The whole miserable business had its origin in selfishness. The strikers were acting under the orders of their officers, of course—men who could not or would not see that in times of readjustment, such as these, every man must bear his share of the burden, instead of trying to shift it to others.

The Summary was very late last month; is not quite so much so this month, and I hope that the August issue will be on time. Hereafter our magazine will be printed by men who care at least as much for the rights of others as they do for their own whims—in an "open shop," where the right to work and earn an honest living does not depend upon membership in a union.

Now, turn to and read an article in this department on "Railway Wages." It most certainly is enlightening.

Public opinion must be educated against this thing of classes of men refusing to work, going out "on strike," simply because they think they can force an increase in pay, decrease in working hours, or some other advantage at the expense of the entire community. Labor is the law of life. Men who will not work are violators of a fundamental law, and they should not be allowed to eat until they are ready to do their part.

"A forty-four hour week" forsooth! In a week of seven days there are 168 hours. It is proposed that but 44 hours shall be devoted to labor, and all the rest squandered in recreation, sleeping or in some other way without value to the community, sure to react injuriously upon the man himself. This country was not opened up, reduced from a wilderness to order and power, and is not now guided, governed and controlled by men who work but 44 hours per week—nor 48, for that matter; but by men who work constantly during every working hour. No man ever yet made himself distinguished among his fellows by working any such limited number of hours. Really strong men never think of the number of hours except to regret that there are not more of them so that more might be accomplished.

I am very sorry for the printers; sorry for any man who is willing to divorce himself from his community by demanding more than his share of the good things of life, enforcing his demand by trying to clog the wheels of industry, thereby showing that he is willing to use force against all other men if necessary to gain his selfish ends. It is a form of banditry, of highwayry, that cannot longer be tolerated.

Let it be remembered that I was once a printer myself. I know the work. It is light, pleasant and agreeable. During this strike I have gone back into the print-shop and have made a pretty nearly full hand in aiding and directing the new men, unfamiliar with the particular kind of work required. And I enjoyed every minute of it. Compared with the exactions of dental practice it is a "picnic." And I cannot help thinking that some of my good friends are pretty sure to regret having thrown up their jobs. All "struck" shops, so far as I know, are now operating comparatively full forces of men who believe in the American plan, the open shop, and in giving full value in labor for the wages received; while employers are learning what it tastes like to have at least some "say" in the management of their own businesses on the inside.

This is the season for vacations, picnics, and recreation generally. Take all you can get without injury to yourself. Remember that you are leaving your office for rest. See that you get it. Do not come back to your office in such physical condition that you need rest before you can go to work right.

The Northern Ohio meeting at Cleveland repeated and confirmed its record of success. Dr. Dayton D. Campbell conducted the only P. G. course. The class was large, and, of course, everybody was more than pleased. Dr. Campbell spent Monday in Toledo, as my guest. He has about all the public work that he can do this year already mapped out. If other Societies desire his services they had better act quickly.

I was very sorry to miss the last Indiana meeting, but couldn't very well be in three places at the same time. This in reply to letters frcm friends, noting my absence, and wanting to know why, etc.

Omaha reports the record attendance of 430 at the State convention May 17.

Dr. Thomas P. Hinman landed some hot shot in the camp of the Hundred-percenters down at Nashville, when he declared that the reckless removal of teeth "to relieve some fancied ailment," was the most ruthless and criminal error ever advocated in dental practice, and one that might well be classed as aggravated malpractice. Dr. W. G. Gillespie followed with the apt remark that too many dentists insisted upon finding what they were looking for in diagnosis. It certainly is encouraging to find such men as these working together to stem the extraction tide. Dr. Hinman wanted to know how many dentists would submit to the indiscriminate removal of their own teeth.

One of the pleasing features of the Nashville meeting was the appointment of Dr. P. D. Houston, of Lewisburg, Honorary President of the body, in some recognition of his many years' service to the Association. The honor was well deserved, and was declared by Dr. Houston to be the greatest ever conferred upon him. Dr. Boyd Bogle never speaks so well as when he is praising somebody who deserves it. The new officers of the Tennessee Association are: George L. Powers, Memphis, president; O. A. Oliver, Nashville, president-elect; C. E. Byington, Chattanooga, first vice-president; Henry Naff, Knoxville, second vice-president; Joe Minor, Nashville, secretary-treasurer, the two offices having been combined. Bristol made a hard fight to secure the '22 meeting, but Memphis was chosen.

A unique and very enjoyable feature of the Little Rock meeting was the address of welcome delivered by Governor McRae, in the House chamber, responded to by President-elect C. U. Mayfield. Governor McRae displayed quite unexpected knowledge of the status of the dental profession in Arkansas, especially as his address was altogether impromptu, he having volunteered to take the place of another speaker, who could not be present. The governor is a man of sterling worth and wide ability, who has the respect of the entire state. By no means an orator, he presented his telling points in the convincing yet simple manner that one would expect from a banker, which he is, never from a politician.

I have heard of conventions being opened with prayer but never before of one being opened "with golf," as appeared in the daily press headlines announcing the opening of the Nebraska state convention at Omaha May 16—and this makes four State meetings during that particular week.

Contract has been let for a new four-story building to be erected in East 34th Street, N. Y., for the college of oral and dental surgery. The new building is to cost $225,000.

New Michigan Law

The new bill regulating the practice of dentistry in Michigan passed the House June 8, and is now the law, having originated in and been previously passed in the Senate. The chief features of the law are contained in clauses increasing the board of examiners from five to seven, and barring from the profession unqualified peripatetic "dentists" who fleece rural communities by promising impossible results of their so-called wonderful operations.

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EAGLE PENCIL COMPANY, NEW YORK

Railway Wages

We print the following editorial from The Toledo Times of Sunday, June 19, as throwing a much-needed light upon the entire wage question. The adage used to be: "The world pays pennies for labor and dollars for thought." Under present topsy-turvey conditions, this is temporarily reversed. And that is why we are all standing on our heads, waiting for some mind big enough and wise enough to turn us right-side up. In the meantime, strikes continue and hunger increases.

Some interesting and much needed light was thrown upon the railroad wage situation the other day at a hearing before the Railroad Labor Board at Chicago when Mr. Fitzgerald Hall, counsel of the Nashville, Chattanooga & St. Louis railroad, presented comparisons of the compensation received by employees of that corporation with the pay of officials in the public service and educators, ministers and others connected with the institutions and churches of Tennessee.

Mr. Hall showed that the governor of the state and other high state officials, judges, college professors and teachers receive less pay than many employees of the railroad he represents. His statements, it was reported, "drew immediate attention from all over the crowded chamber" where the hearing was being held; and no wonder, for the facts it presented were so pertinent to the wage dispute that no person could be indifferent to their significance.

The Nashville, Chattanooga & St. Louis is a 1,200-mile railroad, composed mostly of branches.

"The engineers on the Tullahoma accommodation receive $4,321.92 per year, or $371.92 more than the governor of Tennessee," said Mr. Hall. "You know that's true, Governor," he added, turning to the chief executive, who was present. And Governor Hooper "allowed" that he did.

"Presbyterian ministers, paid $1,600 annually," continued Mr. Hall, "get less than one-half of the wages of yardmasters and passenger engineers. High school principals in Nashville get $250 per month, compared to yardmasters receiving $350. High school teachers at Paducah, Ky., and Chattanooga, Tenn., receive $125 to $148 a month, while blacksmiths get $185.51 and switchmen $188. All professors at Vanderbilt University, Nashville, get $3,750 a year. At the University of Tennessee they get $2,684, and at Georgia Tech $3,600 a year. Why, the conductors on our Rome branch, 18 miles long, get $5,735.88 a year and the baggage men more than assistant professors and instructors. The engineer on the Rome branch gets $5,997, and the superior court judges of Tennessee get $5,500, while the negro flagman and the porter of the Columbia-Decherd branch

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Proper Penetration, Proper Angles and Distance, Proper Time of Exposure.

Every perfect radiograph must be based on these features.

They must be controlled otherwise you are guessing.

The design and construction of the Adams with the use of the Adams film holder controls every one of these factors.

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What does it hold for your patient—Disappointment or Hopes Realized?

THOUGH your patient asks for a mirror the moment the dentures are in place, the real examination comes the moment she reaches home. That first moment alone—she hardly removes her wraps—she ***must*** see if they look natural or if ***everyone*** will know they are ***false!***

That is one of the hardest tests all dentures must meet—how do ***your*** dentures meet it?

Remember that the most perfect-fitting dentures will often ***feel*** like a ***mouthful*** for a day or two, ***but they look natural or false*** the moment they are inserted.

Trubyte

—they look like natural teeth

When the fit is right, dentures soon feel comfortable, but if the teeth look false at first, they will never be satisfactory.

The secret of the success of Trubyte teeth lies in the principle of harmony between tooth form and face form and the application of that principle to the moulds of Trubyte anterior teeth.

Trubyte teeth enable you to make dentures that seem to be a part ***of*** the face not apart ***from*** it.

The problems of focal infection are increasing the removal of pulpless teeth and comparatively youthful patients are presenting for denture restorations. While everyone is interested in appearance, the young matron is perhaps the one most vitally concerned, and the one for whom artistic denture restorations will effect the finest results. Such results are gratifying from every viewpoint—and are practice builders.

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get $3,146, or $146 more than the district attorneys-general of Tennessee.

Mr. Hall declared that the living wage argument of the employees could not stand in the face of such figures.

No man without prejudice can deny that statement. It is when we come down to specific figures and honest comparison of the compensation received by men working on railroads and others in the public service, of high or low degree, that the over-payment of the railroad employees becomes manifest. They cannot justify it as related to official salaries, to the pay of public benefactors or to the compensation of other wage earners. Indeed, the members of most branches of labor appear to as poor advantage in a general comparison of railroad and other wages as the clergyman and school teachers—and everybody knows where they stand.

At a time when we are seeking industrial and commercial readjustment on a basis looking to the prosperity of all, it should be apparent to all that railroad employees must concede something substantial, through a reduction of their own wages, to other labor and to the professions and the public service.

Financial aid hitherto given to the free school clinic by the school board of Portland, Oregon, has been withdrawn for the reason that the board has no legal right to make appropriations for such purposes. The annual cost of the clinic is given at $14,000, half of which has been paid out of school funds.

Minnesota—Southern

Mankato, June 8.—Southern Minnesota dentists brought their eighth annual meeting at this city to a close this afternoon after a two days' successful convention. At the business meeting held yesterday evening the following officers for the ensuing year were elected:

President, J. W. Englis, Redwood Falls; Vice-President, A. H. Cox, Faribault; Secretary and Treasurer, G. W. Norris, Tracy; Member of Executive Council, A. R. Schmid, Worthington.

Massachusetts—Northeastern

Boston, June 8.—With more than 150 delegates in attendance, the Northeastern Massachusetts Dental Society opened a three days' convention at the New Ocean House in Swampscott yesterday. Following the annual business meeting and election of officers, papers on dental hygiene were read by visiting dentists from New York, Toledo and Massachusetts cities.

The election resulted as follows: President, Dr. E. W. Marvin, of Lynn; Vice-Presidents, Drs. M. E. Davenport, of Peabody; W. H. Pepin, of Lowell; E. Jeffrey, of Salem, and J. B. Leonard, of Haverhill; Secretary, Dr. H. J. Yale, of Peabody; Treasurer, Dr. T. F. Parker, of Wakefield. The Honorary Board of Directors, comprising Drs. C. W. Partridge, of Lawrence, George Smith, of Lynn, C. O. Hood, of Beverly, G. H. Newell, of Gloucester, and H. E. Davis, of Lowell, acting with the newly elected officers, named a board of 16 directors for the society.

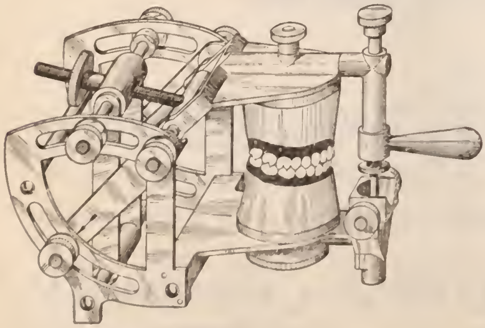
Ohio—Northern

Cleveland, June 7.—Dr. J. J. Welker, Toledo, was elected President and Dr. J. B. Gentilly, Cleveland, Vice-President, of the Northern Ohio Dental Association at the opening business session of the convention yesterday.

Other officers chosen for the ensuing year were: George B. Smith, Fremont, Secretary, and T. J. Hill, Cleveland, Treasurer. H. R. C. Wilson, Cleveland, and L. E. Phelps, Toledo, were elected new members of the executive committee. J. W. Hartshorn, Toledo, a holdover member, will be chairman. Five hundred men were registered.

High Honors for a Woman

Cincinnati, June 7.—Mrs. Anna R. Chase, Cincinnati, only woman graduate of Ohio College this year, is the holder of a gold medal and five silver medals for college attainments. She had the distinction of delivering the class valedictory at the college commencement recently, the only time this honor has been conferred upon a woman. Mrs. Chase plans to operate an office jointly with her husband, Dr. Charles E. Chase, practising dentist of Cheviot.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TO REACH MILWAUKEE BY AUTOMOBILE

Milwaukee, Wisconsin, always a Mecca for automobile tourists, is expected to draw an unprecedented number of motor enthusiasts during the week of August 15 to 19. It is confidently expected that several thousand delegates to the national convention will avail themselves of the opportunity for a vacation jaunt by automobile to Milwaukee.

The advantage of going to Milwaukee by motor car does not have to be enumerated, especially where the start toward the convention city is made at a distance of a couple of hundred miles. The various highways leading into Milwaukee seem to be so many invitations to enter the portals and enjoy the hospitality of the nearly half million people of the Badger metropolis.

Milwaukee has an abundance of public garages and ample parking space within a stone's throw of the business and hotel district, where, for a nominal fee, the tourist may leave his car with the knowledge that it will be there when he wants it.

The Milwaukee committee in charge of affairs in connection with the annual convention have been assured the most complete co-operation of the city's automotive dealers in providing for the comfort, convenience, and pleasure of visitors. And they can be counted upon to the last man to live up to the letter of their promises. They have a reputation long since established.

It is of interest to note that it is possible to cross Lake Michigan by automobile from lake ports, such as Ludington and Manistee and to enjoy a dustless trip. The passenger steamers plying between points in Michigan and Milwaukee carry automobiles at so much per wheel base and the number of passengers accompanying the machine.

The following general outline of an automobile trip from Chicago to Milwaukee will be found convenient and helpful, as well as interesting from a scientific standpoint. The route suggested is the most popular and takes the tourist through the beautiful north shore suburbs or "Gold Coast," as it is referred to, to Lake Forest, passing Fort Sheridan and Great Lakes Naval Training Station. From Lake Forest to Milwaukee the route traverses a rich and highly improved farming section. The route referred to, known as Route 15, takes the tourist by way of Sheridan Road and the lake shore all the way through Evanston, Wilmette, Kenilworth, Highland Park, Fort Sheridan, Lake Forest, Great Lakes, Waukegan, Kenosha and Racine. There is pavement, concrete and macadam to Waukegan; dirt, sand, and gravelly dirt, to the state line near Winthrop Harbor, with the balance of the highway of concrete and macadam. It is an exceptionally easy matter for the tourist to find his way along the route, as the markings are distinct and occur with great frequency, and there is little to do other than drive the machine and take in the passing scenery.

Evanston, the first city of importance encountered on the trip, is one of Chicago's prettiest and most aristocratic suburbs, and is located on Lake Michigan. It is distinctive for its many beautiful homes of Chicago's captains of industry and finance. It is the home of the Northwestern University and the Garrett Biblical Institute. Highland Park, about twenty-five miles from Chicago, is situated on a bluff about 100 feet above Lake Michigan, and is also a city of many wonderful homes. Waukegan, famous as the Gretna Green of the northwest, is located about equidistant from Milwaukee and Chicago, and is the center of activity for the large number of naval training station men off duty. The city abounds in beautiful ravines which are being improved by the park board for the benefit of the public.

The Great Lakes Naval Training Station, famous throughout the nation, is a great attraction for tourists. Here as many as 28,000 bluejackets have received training at one time. Among some of the more important points of interest are the main mess hall at which 1500 men can be accommodated at one time and the main athletic field which is one of the finest in the country. Kenosha, located on the west shore of Lake Michigan, is best known for its manufacturing industries. It has an excellent harbor and U. S. Life Saving Station. One of the prettiest drives in the city is Durkee Avenue, and Kenosha proves a magnet for tourists by reason of its beautiful homes. Kemper Hall, one

(Continued on page 646)

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in a lifetime and before doing so

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EDWARDS Mobile Tube Holder (at your finger tips.
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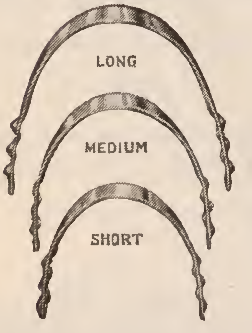

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There's an air of confidence about the salesman who calls on you from the depot that sells Williams Gold.

And why not? Williams Dental Golds are merely symbolic

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The salesman who sells Williams Golds is usually a good man to entrust with your orders for dental supplies of all kinds.

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- Wire
- Casting Gold
- Ready-Made Lingual Bars

DENTAL GOLDS

(Continued from page 643)

of the leading girls' preparatory schools in the west, is located here.

Racine is distinctly a manufacturing town located on the west shore of Lake Michigan. It is the home of the famed Horlick Malted Milk Co., and the J. I. Case Threshing Machine Co., known the world over. The city is handsomely laid out and provides a most interesting drive-about for the tourist.

Zion City is the seat of the singular religious community founded by John Alexander Dowie in 1900, 6,000 acres of land having been purchased by him there at that time. The Zion City lace industry is famed throughout the country and the plant wherein the Dowieites work is the largest in the world. Beulah Park, one mile north of the city on Sheridan Road, is one of the most beautiful wooded ravines between Chicago and Milwaukee.

The distance from Chicago to Milwaukee, according to the best authorities along the route as outlined above, is about 94 miles and scenically, industrially, and historically interesting every inch of the way.

There is another route for convention delegates coming from the western borders of Wisconsin, the La Crosse to Madison and then to Milwaukee route. This is via Elroy, Reedsburg, Baraboo and Sauk City, along dirt roads, principally. Practically all along this route there is sand road for wet weather travel and clay road for dry weather, the route-makers having combined these features to make the best possible under existing conditions. The traveler to Milwaukee from this direction passes through some of the most wonderful agricultural sections to be found anywhere in the world, and scenically it beggars description, but seems to impress upon the tourist the importance of the injunction "See American First." The hospitality of the people enroute is of the most marked variety. The latch string is always out and there is always something to please the palate of the hungry, thirsty, tired and travel-stained tourist. In fact there is no particular section of the state which is favored in one way more than the other in this respect and no matter what avenue the motorist takes on his trip Milwaukeeward, he will find the Wisconsin spirit everywhere is one of cordiality, hospitality, and helpfulness.

Fast Work

Atlantic City, N. J., June 2.—A young woman sat in a dentist's chair before the 500 delegates to the annual convention of the New Jersey Dental Society here today while Dr. Edward D. Frost, of Elizabeth, demonstrated the possibilities of speedy extraction, drawing twenty of her teeth in nine minutes. Temporary plates were fitted and she left the chair in thirty minutes.

The main topic before the convention is the relation of infected teeth to systemic septic affections. More radical members of the profession favor extraction of every infected tooth, while others argue for curing the infection and saving the tooth. The delegates as a whole have not expressed an opinion.

The Old-Fashioned Chaw

Hail to the old-fashioned chaw! It belongs! Dr. William H. Golston, of Camden, told the members of the New Jersey State Dental Society, recently, that "an old-fashioned chaw of tobacco is one of the best disinfectants known to dental science. It forms a sialagogue (promoting saliva) around the teeth, thus preventing bacteria from getting a foothold. A cigar forms the same function to a less degree, but a cigarette, because of its paper wrapper, has no value in this respect."

We have always had a great respect for the gentlemen who could register on a cuspidor ten feet away, but we never knew that they were titillating their senses and protecting their teeth at the same time. Perhaps they were wiser than the public knew. Anyway, who ever heard of a consistent tobacco-chawer having to wear dentists' contraptions before three score and ten?

To Honor College Founder

Swampscott, June 9.—Members of the Baltimore College of Dental Surgery Alumni Association, at their annual meeting and convention held last night, voted to hold their convention next year in Baltimore and at that time unveil a memorial to Dr. Chapin H. Harris, founder of the Baltimore dental college and which was the first institution of its kind in the world.

Officers elected were: President, Frank P. Duffy, Riverpoint, R. I.; Vice-Presidents: L. A. D'Argy, Waterville, Me.; A. A. Blondin, Manchester, N. H.; Arthur Soule, St. Albans, Vt.; A. L. Cairns, Brookline; W. R. Burke, Providence; J. Leo Loftus, Meriden; Secretary, F. H. Parks, Boston; Treasurer, Edwin J. McQuillan, New Bedford; Executive Committee, Henry A. Martin, Newport, R. I.; Arthur E. Rogers, Waterbury, Conn.; P. F. Slocomb, New Bedford.

Arkansas—State

Little Rock, May 19.—Dr. C. U. Mayfield, of Pine Bluff, was elected president of the state dental association at a banquet and business meeting of the association, held Wednesday night. J. T. Newman, of Little Rock, was elected president-elect for 1922. Other officers elected were W. F. Rowland, of Ft. Smith, first vice-president; J. W. Deaton, of Stamps, second vice-president; W. E. William, of Little Rock, secretary and treasurer, and A. E. Chamber, of Texarkana, member of the executive committee.

The banquet was attended by approximately 200 dentists, and was featured by a "musical revue" entitled "The Dentists' Midnight Colic."

But one perfect mouth was found during the examination of 523 school children at Luverne, Minn.

Dentistry is now classed as on a par with medicine in the University of Berlin. Dental teachers are now full professors.

Deaths

At St. Luke's Hospital, May 24, Dr. E. W. Knickerbocker, aged 63.

At Stoughton, Mass., May 16, Dr. W. E. Chase.

At Denver, Colo., May 25, Dr. Webster M. Shirley, retired.

At Washington, D. C., May 22, Dr. Henry Clay Thompson, aged 71. For 28 years he had been lecturer and part of the time Dean of the faculty of George Washington University dental school.

At Bath, N. Y., June 6, Dr. Asa F. Lantz, aged about 70.

At Syracuse, N. Y., June 6, Dr. Ernest Eveleigh, aged 38.

At Danville, Ill., May 28, Dr. Ralph Swift, fell through a second-story window in his office and was fatally injured.

At Chicago, Ill., June 16, Dr. Charles N. Thompson, aged 61. He was well known as the author of works on dentistry.

At Carlisle, Pa., June 7, Dr. Jacob L. Weirick, of Steelton.

At Belleville, N. J., June 9, Dr. Alfred E. Martin, formerly of Milwaukee, aged 34.

Who Is Joseph Lobosco?

Does he want $39.24? We have an entry in our books under date of December 30th, 1918, in favor of one Joseph Lobosco $39.24. This amount has been received, and unfortunately our bookkeeper neglected to enter the place from which the money came. At the time there was no record of an order, and it was decided to wait for the order, which we expected to come, as a matter of course. While waiting for this order the item was forgotten. It now turns up in our books, and troubles our conscience.

If Joseph Lobosco is still alive, or if anybody knows who he is, will he kindly step forward, and communicate with the undersigned, so that he can quiet his conscience?

It is presumed that the money came by postal order from a foreign country, but without data it is impossible to locate the source of the remittance.

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New York City.

Montana—State

Billings, May 18.—The Montana State Dental Society voted at its meeting to change the name of the organization to the Montana State Dental Association and to incorporate. The state was also divided into 13 districts and councillors were elected from each district, these councillors with the newly elected state officers to form the governing body of the corporation.

C. H. Head, of Helena, is the new president of the association. G. J. Packard of Livingston is vice-president; J. E. Baker, of Great Falls, is secretary-treasurer and J. E. Buehler, of Great Falls, manager of clinics.

The New York college of dentistry graduated a class of 126, June 15.

John W. Dowd, LL. D., formerly oral hygiene lecturer for THE DENTAL SUMMARY, one time superintendent of education in Toledo schools, is now a full professor in the University of Toledo.

Dr. Bartz, a prominent Illinois surgeon, has just been released from incarceration in an asylum, having been completely restored to the normal use of his mind through the extraction of several defective and, probably, impacted teeth.

"How did you get your mustache into this condition?" asked the barber. "I tried to steal a kiss from a girl who was chewing gum."

—*Kansas City Journal.*

Most sickness comes from a failure to make motion balance emotion. Impress and express; inhale and exhale; work and play; study and laugh; love and labor; exercise and rest. Study your own case and decide to get the most out of life. Sickness, unhappiness, ignorance, all tend to inefficiency. And inefficiency is the only sin.

Realize that you are a Divine Transformer.

Make a motion equal emotion, and you will eliminate fear and be efficient to the last. And to live long and well is to accept life in every phase—even death itself—and find it good.

—*Elbert Hubbard.*

You may have hoped for the time when you could have a few thousand dollars laid aside. You want that fund to work for you, to bring you, say, $60.00 a year for each $1,000 invested. But don't talk about such a gain from interest while you are even now spending uselessly or needlessly $60.00 or $600 in a year. That would be interest on $1,000 or $10,000, and you are throwing it away. Your carelessness is evidence that you don't want that income you are dreaming about. If you do want it prune your expense account.

THE COMMON CASE OF POOR LO

When Lo, the Poor Indian, suddenly found
His blankets too short at one end,
He sat down to think in a manner profound
Of a way the said shortage to mend.
He studied and fretted around quite a while
Till of wrinkles he had quite a crop;
But at last he arose with a triumphant smile
And whacked a piece off the top.
Then with a sly nod of his crafty old head
He grunted and said, "Now me
Poor Lo go and gittum a needle and thread
And sew that piece on the bottom!"
We laugh at poor Lo in our cinical way,
Yet I date say he reasoned as well
As those who expect frequent raises in pay
To keep up with the H. C. of L.

—*Indianapolis Star.*

SURE SAFEGUARD

"What is the best fire preventive?" asks a weekly journal. The answer is, the present price of coal.—*Punch* (*London*).

Real Work

Old Hilton had strong ideas on many things, and never hesitated to voice them. one day he was accosted by a healthy looking individual, who begged for a copper to buy food.

Hilton eyed the man sternly.

"Why do you waste your time begging?" he said, coldly. "You ought to be working."

The suppliant drew himself erect.

"Have you ever begged?" he demanded in return.

"Of course not!" snapped old Hilton, angrily.

"Then you don't know what work is!" the beggar retorted.

The Wages of Sin

"Brethern!" exclaimed the preacher as he came across a portion of his flock engaged in pursuing the goddess of chance. "Don' yo' all know it's wrong to shoot craps?"

"Yas, pahson," admitted one parishoner sadly, "an' b'lieve me, Ah's payin' fo' mah sins."

Positive Pleasure

Two dentists were talking "shop."

One remarked:

"My treatment is so painless that it often happens that my patients fall asleep while I am attending to their teeth."

The other dentist gave a depressing shrug of his shoulders.

"Pooh, pooh, my dear man! That is nothing!" he cried. "You should see my place with all the latest improvements. Why, my patients nearly always ask me to send a message to fetch a photographer so that they can be photographed with the expression of gladness which my patent dental treatment alone can give them."

Use Your Head

A Woodpecker pecks
Out a great many specks
Of sawdust
When building a hut;
He works like a nigger
To make the hole bigger,
He's sore if
His cutter won't cut.
He don't bother with plans
Of cheap artisans,
But there's one thing
Can rightly be said:
The whole excavation
Has this explanation:
He builds it
By
Using
His
Head.

—Harlem Davis

It is impossible to succeed by doing less than one's best. It matters little whether one's job be running an elevator, pounding a typewriter, running a turbine engine, handling tools, stoking a furnace, repairing a line, answering correspondence, obtaining contrcts, or directing a great company, it is the doing of the work that elevates character or degrades it. The kind of work means nothing—it is the spirit you put in the doing that counts.

IN DANGER

"Bennie Beanborough says he is nobody's fool."

"I know, but some one will get him yet."

—*Youngstown Telegram.*

STRANGE AND WILD

"Do tell us about the Great Wild West," said the impressionable young woman.

"You may not believe it," replied the tourist, "but I found a little town in North Dakota where there was not a single motion-picture theatre."—*Birmingham Age-Herald.*

Learn from your mistakes. but don't cry over them. We best redeem the past by forgetting it.

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REGULAR CONTRIBUTIONS

THE DENTAL SUMMARY
THE MAGAZINE THAT HELPS

Vol. XLI August 1921 No. 8

THE ROENTGENOGRAM AS AN INDEX OF IRRITATION OR INFECTION OF DENTAL ORIGIN

BY WILLIAM A. LURIE, M.D., NEW ORLEANS, LA.

(Written for THE DENTAL SUMMARY)

THE TIME FOR THE indiscriminate removal of teeth as a panacea for all ills of human flesh is fast passing. The day of the extremist has passed its zenith. It is to be hoped that the sacrifice of teeth which resulted in the use of the roentgenogram to determine good from bad has had its benefits.

The advent of dental X-ray was the starting point of this wave of wholesale tooth extraction. A rational understanding of the portrayal noted, and a comprehensive application of the findings as a possible source of the symptoms a patient may have, or the warning of what changes in health may result in later years due to the continued irritation or intoxication, is the real future of dental roentgenography.

Too much condemnation cannot be brought against the practice of the use of the dental roentgenogram to portray an area known to be infected, and the neglect to portray a similar area in a patient presenting similar symptoms because of a lack of the knowledge of there being a pathological entity present. Likewise the practice of omitting the portrayal of the teeth when an attempt to exclude the teeth as a causative factor in disease is being made is to be criticised as unscientific where these organs appear in more or less perfect condition.

The taking of dental roentgenograms in large numbers, and the study of such pictures with a view of tabulating the findings and associating these findings with symptoms as to cause and effect, is a work beyond the possibility of any one person. I do not know of any group of physicians or dentists who have undertaken it. This paper, therefore, being the results of my own efforts and from my own practice and observations, is not to be considered as an accurately detailed scientific report, but rather as an observation that may stimulate or indicate to some group, in a position to do so, a field filled with possibilities and a monumental work of this type for the future generations.

Roentgenographic findings, and particularly those of infections of the jaws, can be divided into those of more acute type and those of chronic type, with destructive and regenerative changes in bone, pictured as they take place in the jaws. Those findings of irritating type that can be noted may be classed as congenital, post-operative and accidental.

There are of course any number of possible alterations which can be noted through the variation in the acuteness or the chronicity of any given case. The length of time that a process, either irritation or infection, has existed is a great factor governing changes seen. The greatest difference in any process however is that governed by the age of the subject. It is a fact that infections and irritations are possible at any age. It is also a fact that at different ages, development varies.

To comprehensively understand a dental roentgenogram it is necessary to know the stage of development that has been reached by the subject in whom the picture was taken. This primary factor is more easily portrayed in roentgenograms of the teeth than in those of any other portion of the body. Teeth are seen in numbers, position, size and stage of development with a wonderful degree of regularity. The developmental changes in individual teeth is also a matter of almost absolute regularity. The continued study of dental roentgenograms makes possible a fairly accurate estimate of age, particularly up to the age of eighteen. Over eighteen years of age there is a possibility of a close approximation though the accuracy may be lessened.

Coupling with the stage of development due to age, the various pathological possibilities as they may exist in stages of life, and also the possibilities of self limitation or regeneration of a pathological area, one can arrive at a more comprehensive decision as to when to extract a tooth and also determine what benefits, if any, would result, or if it would be best to treat and retain it.

It is a proven fact that a young subject can care for and overcome a greater amount of infection and accommodate itself to a greater amount of irritation than an older one can. Any infection to a degree, is not as serious a problem in a younger subject as it is in an older one. Therefore to extract or to treat an infection must be in part at least, determined by the age of the patient and the possibilty of overcoming such infection. In the young person where the incident of regeneration and tolerance is high, there is a greater possibility of overcoming an infected area in the mouth and have it considered a safe entity to maintain in the mouth, than in a person past the age of regenerative power and beyond the time of easy tolerance.

It is likewise true that consideration must be given to quantitative destruction. By quantitative destruction I mean the extent of destruction which often continues over a great period of time and is in itself of great magnitude, greater than a patient's tolerance or possibility of overcoming and ultimately regenerating the destroyed area.

An insignificant infection of long duration, or a mild irritation over a protracted time is a serious item to any person. In the one instance it is an infection which is to be found, whereas in the other a sapremia, a condition of toxicity without infection. The influences of prolonged presence of either of these processes are not without effect locally and generally. The possibility of locally overcoming a process, and the regeneration of a lost or destroyed part does not always carry with it the same possibility in reference to some distant organ as the kidney or gall bladder, prostate or ovary, wherein a secondary or metastatic focus might have been established. There is also the lack of properly determining the time when secondary process becomes established, and the lack of determining the extent of the benefit which does result from the removal of the inciting focus after a metastatic or secondary process has resulted.

Bearing in mind these several possibilities as they relate to mouth conditions and particularly the teeth and their roentgenographic appearance, it has been the author's method to base his decision of removal of infection or irritation about the mouth and jaws on two principal factors. First and foremost, the age and physical condition of the patients as an index of their ability at regeneration and the elimination of toxicity, and second the relation the possible time of existence of the lesion and of symptoms bear to one another.

Considering the associated symptoms, a case in which a focus is discovered within the mouth, it is preposterous to consider an infected area of recent development in a patient of say twenty years, to be the cause of the symptoms of a condition which that patient has suffered since infancy or childhood. Likewise in the finding of an incomplete development or a congenital mal-formation, it is preposterous to consider them the cause of acute symptoms, unless changes of an acute nature are discovered about such an area.

An infection or a destroyed area may have developed at a time of great tolerance and high resistance, and may have at such time been overcome. Such overcoming of infection may have resulted by obliteration or by the area becoming circumscribed. Each of these methods can be pictured; each has its distinctive features. The changes which take place due to healing, under conditions of physical health, and its alterations due to disease and the breaking down of such an area can be pictured distinctly.

It can be noted that where an infection has been circumscribed and the resistance of the patient becomes lowered, that the visible area of alveolar thickening which constituted the circumscribing portion of bone, gradually shows a thinning out and eventually may be seen to disappear.

A process such as described, transforms a quiescent infected focus into an active one. It is at times the result of a lowered vitality as described, or may result from the advancement of age of the patient beyond the period of active and constant regeneration, to that of lessened functional activity and regeneration. Under the stimulation of the addition of another infection most often introduced by surgical means or in attempts to relieve the focus discovered, the protecting wall of denser alveolar process is broken down, and the infection or toxic material permitted to disseminate throughout the body.

The significance of any infection and particularly those about the mouth is controlled in great part by the index of the patient's regenerative power and tolerance. As a general rule, power of regeneration and tolerance varies in inverse ratio to one another and each in turn varies inversely to the age of a patient. That is to say that at puberty the regeneration and tolerance should have their best ratio relative to their influence on the patient's health. As age advances from puberty regeneration decreases, while tolerance increases or even remains stationary. As the age of approximately forty years is reached, regeneration has appreciably decreased and may even cease, and tolerance, particularly to old circumscribed infections is also diminished.

As a general rule therefore, it has been the author's method in younger patients where a small and localized area of infection is noted about the tooth, not to recommend the removal of such a tooth, particularly when the symptoms of infection, both objective and subjective can be controlled by the proper treatment. If however there are found a number of such areas in a patient under similar conditions, there must be an attempt made to reduce that patient's toxicity and intoxication to the point within the range of tolerance so that regeneration can take place in areas left for treatment.

In a person in middle life with a minor proportion of devitalized and dead teeth, and with a condition requiring treatment to no extensive degree, and where the general health appears good, the extraction of teeth even in the presence of the finding of considerable alveolar absorption is not always advised. Particularly is it discouraged where the patient can be kept under constant observation. If such a tooth should not respond to treatment as indicated in subsequent roentgenograms, it is advised that it be removed.

After the age of regeneration, arbitrarily set at say between forty and fifty years, the treatment of any areas of alveolar necrosis or infection is not advised. The two factors of secondary infection introduced by attempts to encourage regeneration and lack of tolerance to infection enter into this determination.

Relative to the processes classed as irritative a similar course in determination should be followed.

In the young, an unerupted tooth is most often not irritant unless secondarily infected. In the aged, or in instances where an unerupted tooth exists long after the period at which it should erupt, it is most often an irritant, and if infection exists about it, its removal is absolutely and urgently necessary.

Such a process presenting in a patient beyond the age of regneration opens up the possibility of such constant irritation in the presence of infection, exciting cell growth and malignant formation.

What was said relative to teeth, is also true in relation to fillings in teeth and bridges of all types. In these latter, the finding of overhanging margins on fillings and bridges and the catch-all margins on mother-hubbard crowns are all possible of picturing in a good dental roentgenogram. They constitute irritants. Every phase of what the film pictures, including fillings, crowns and bridges, plus the local condition in the mouth at the point pictured, and the entire mouth, as well as the patient's general physical condition, must be thoroughly considered before a decision to extract or not to extract teeth should be made.

This paper in no way is intended as an excuse for the extraction of teeth nor as an incentive to extract a greater number of teeth, but it is intended to be a stimulus for a better interpretation of such roentgenograms as are being taken and an appeal to take a proper number or rather a necessary number of roentgenograms in all cases.

1130 Maison Blanche Building

STRUCTURAL CHANGES WITHIN THE PULP CANALS OF TEETH FOLLOWING PARTIAL PULP REMOVAL

BY WALLACE CLYDE DAVIS, B.SC., M.D., D.D.S., LINCOLN, NEB.

(Continued from page 570 July DENTAL SUMMARY)

History of Case 157. Radiogram taken before extraction. Patient's name was not secured. Tooth furnished by Dr. F. who reports that tooth came to him in December 1904 in a semi-putrescent condition. The mesial canals were putrescent. These were treated and filled with a medicated paste. The distal root contained a vital pulp and this medicated cement was placed over the stump and the tooth filled on the above date. It will be seen that the mesial canals remained infected. A large granular mass about the mesial root was the cause of its final extraction in June 1920, or sixteen years after the operation. Note the tissues about the distal root and the seeming absence of any canal. The pulp which was allowed to remain in the distal root must have been more or less infected, and no doubt was in the various stages of inflammation. The roots were prepared and twenty-one sections made of each root. Five of the distal root are shown in four magnifications. (A) First section.

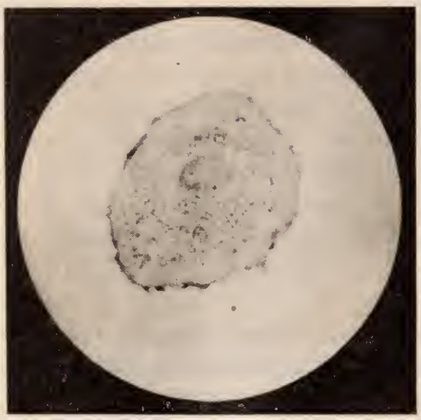


Fig. 33

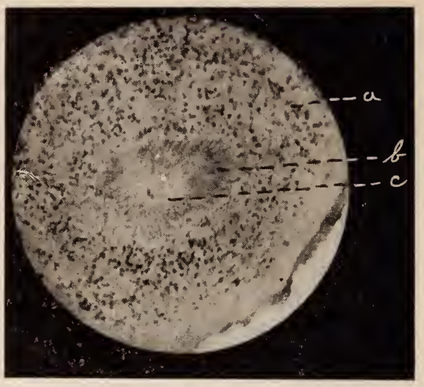


Fig. 39

Fig. 38 (Case 157).—Section A. First section at very tip of the dentin. (Magnification 20 X.)

Fig. 39 (Case 157).—Section A. (a) Cementum. (b) Dentin. (c) Osteoid tissue fully calcified and filling the canal. (Magnification 50 X.)

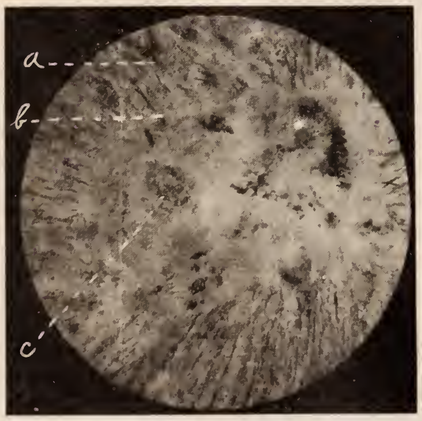


Fig. 40

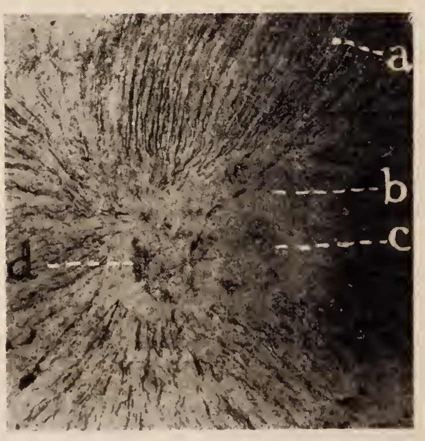


Fig. 41

Fig. 40 (Case 157).—Section A. Higher power of Figure 39 at (c). (a) Dentin. (b) Osteoid tissue fully calcified, filling the pulp canal. (c) Remains of calcified artery. (Magnification 430 X.)

Fig. 41 (Case 157).—Section A. Micro-projection. (a) Dentin. (b) Osteoid tissue. (c) Remains of calicified artery. (d) Lacunae. (Magnification 320 X.)

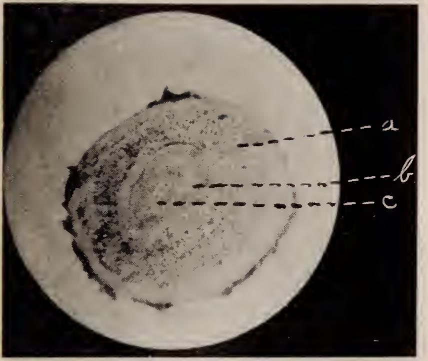


Fig. 42

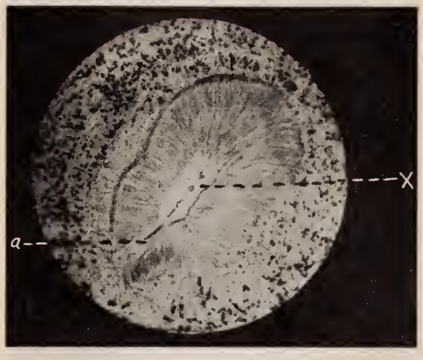


Fig. 43

Fig. 42 (Case 157).—Section B. (a) Cementum. (b) Dentin. (c) Osteoid tissue filling the pulp canal. (Magnification 20 X.)

Fig. 43 (Case 157).—Section B. (a) Place at which there had been resorption through the dentin to the cementum, subsequently filled with osteoid tissue. (Magnification 50 X.)

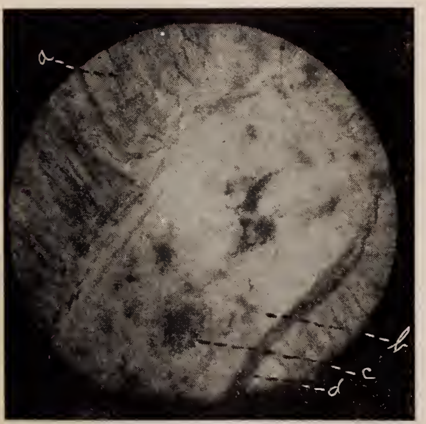


Fig. 44

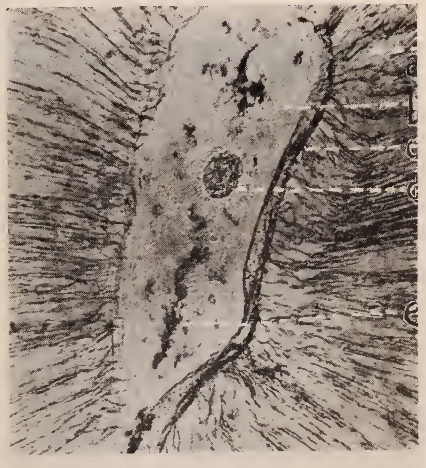


Fig. 45

Fig. 44 (Case 157).—Section B. Higher power of Figure 43 at (x). (a) Dentin. (b) Osteoid tissue fully calcified. (c) Remains of calcified artery. (d) Osteoid tissue not fully calcified which has taken a deep eosin stain. (Magnification 430 X.)

Fig. 45 (Case 157).—Section B. Micro-projection. (a) Dentin. (b) Osteoid tissue fully calcified. (c) Osteoid tissue not fully calcified. (d) Remains of calcified artery. (e) Lacunæ poorly formed. (Magnification 320 X.)

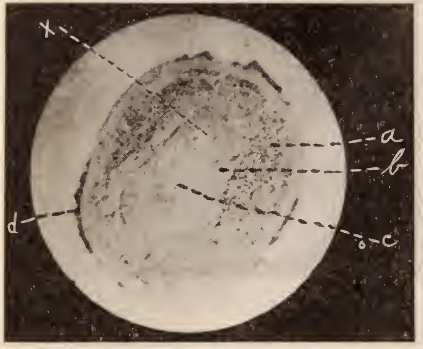


Fig. 46

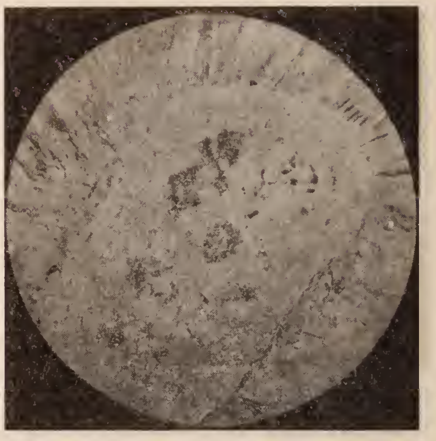


Fig. 47

Fig. 46 (Case 157).—Section C. (a) Cementum. (b) Dentin. (c) Osteoid tissue. (d) Peridental membrane. (Magnification 20 X.)

Fig. 47 (Case 157). Section C. Higher power of Figure 46 at (x). (Magnification 50 X.)

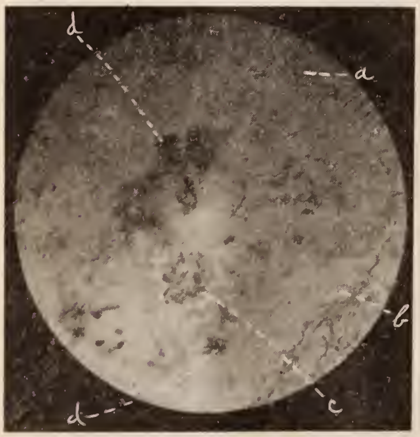


Fig. 48

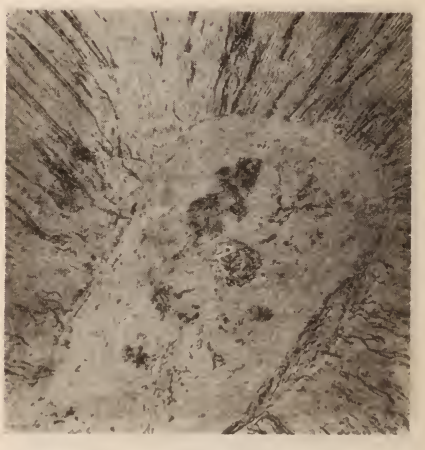


Fig. 49

Fig. 48 (Case 157).—Section C. Higher power of Figure 47. (a) Dentin. (b) Osteoid tissue. (c) Remains of calcified artery. (d) Lacunæ with canaliculi. (Magnification 430 X.)

Fig. 49 (Case 157). Section C. Micro-projection. (Magnification 320 X.) See description of Figure 45.

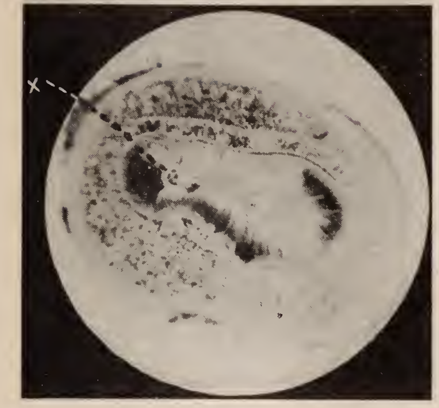


Fig. 50

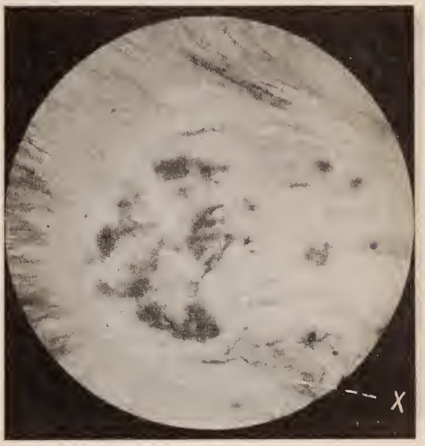


Fig. 51

Fig. 50 (Case 157).—Section D. (Magnification 20 X.) See description of Fig. 42.
Fig. 51 (Case 157).—Section D. Higher power of Figure 50 at (x).

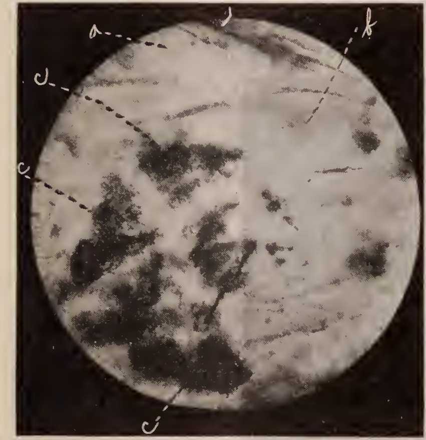


Fig. 52

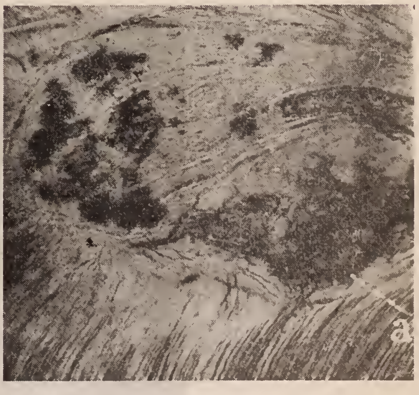
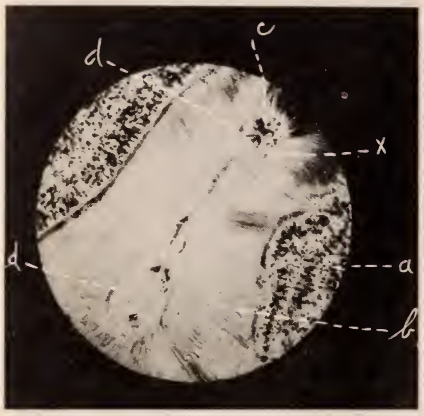


Fig. 53

Fig. 52 (Case 157).—Section D. Higher power of Figure 51. (a) Dentin. (b) Osteoid tissue fully calcified and studded with (c) lacunæ. (Magnification 430 X.)

Fig. 53 (Case 157).—Section D. Micro-projection of Figure 51 at (x). (a) Calcified area following a resorption of the dentinal wall. (Magnification 320 X.)



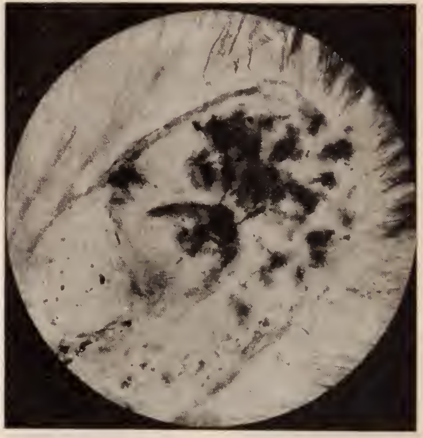


Fig. 54

Fig. 55

Fig. 54 (Case 157).—Section E. (a) Cementum. (b) Dentin. (c) Cemental and osteoid tissue filling the pulp canal. (d) Points of independent construction. Probably the points of last calcification because of being the position of the last active blood vessels. (Magnification 20 X.)

Fig. 55 (Case 157).—Section E. Higher power of Figure 54, at (x). (Magnification 50 X.)

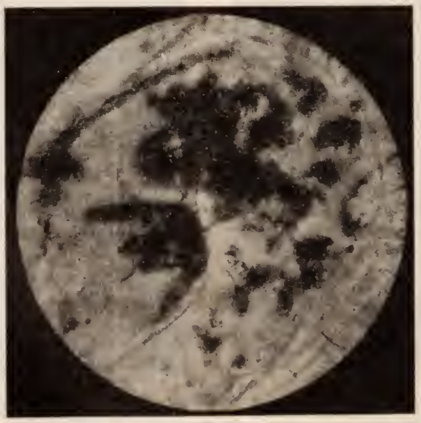


Fig. 56

Fig. 56 (Case 157).—Section E. Higher power of Figure 55 at (x). (Magnification 430 X.)

ARTICULATION OF UPPER AND LOWER DENTURES, USING THE COMPENSATING-CURVE BITE-PLATES

BY JOHN LOUIS HELMER, D.D.S., KOKOMO, IND.

(Written for THE DENTAL SUMMARY)

THERE SEEM TO BE opinions expressed by some denture prosthetists that an anatomical articulator is not well suited to the setting up of artificial dentures. I have studied the writings of these different men and I have not been able to coincide with their way of thinking, for I believe that the closer an anatomical articulator approaches the dimensions and movements of the individual patient's jaws, the better is this articulator suited upon which to set up artificial dentures for this particular patient.

Now understand what I mean: an ideal articulator should have no set center of rotation, no set path of the condyle, no set inter-condyle width, but should be so constructed that these dimensions and movable parts can be adjustable to the dimensions and movements identical to those of the individual patient's jaws for whom the dentures are to be made. I mean that an articulator should be so constructed that it could be adjusted to exactly coincide to the width between the condyles of any patient, and that the condyle path of the articulator could be so adjusted as to exactly coincide with the condyle movements of the jaws of any patient. Also that the lateral movement could be so arranged for, if found to exist in the patient's jaws. Also, that changeable rotating centers could be arranged for if desired in this ideal articulator. Considering that there is a difference in the measurements of different jaws, and that as the condyle paths differ, and that some jaws have more lateral motion than others, and that the rotating centers differ, it is logical to say that an articulator with fixed arbitrary measurements and fixed condyle movements, etc., is not much better than the Bonwill of 1858.

The geometrical designs drawn out by advocates of certain articulators are very confusing and dumbfounding to the majority of practitioners, and I feel sure that most dentists say to themselves, "If I have to learn all this geometry so as to make a good set of teeth, I'll never make a first-class plate." I wish, therefore, to give out a simple and accurate procedure for making upper and lower dentures.

For several years I have been studying a simple and logical method of mounting upon an articulator, and of adjusting the movements of the articulator to correspond accurately with those movements of the patient's jaws, and I have concluded that the Snow Acme articulator is the most suitable instrument on the market at present.

My procedure after securing a set of good models, upper and lower, is to set up trial bite-plates, carving them as closely as possible to the compensating curve which I judge would suit the movements of the patient's jaws, then trying them in the mouth to see if they occlude all around. If they do not, I alter them until they do. Then I oil the surface of either upper or lower, and while these bite-plates are in the mouth I instruct the patient to close, bite, and to chew lightly upon them so that I may see if these bite-plates are compensating to the movements of the jaws and condyles.

I wish to get in this way the compensating-curve bite-plates where the lower plate slides and glides about in perfect and constant contact with the upper. If I find that as the patient shifts the jaws to the right there is a slight space between these compensating-curve bite-plates on the left side or *vice-versa,* I then warm the occluding surface and place them back in the mouth, instructing the patient to close, bite, and lightly give the chewing movements, until I secure a constant and perfect compensating-curve bite-plate, of course always keeping the surface lubricated with some oil so that they do not stick and pull out of shape.

By securing this set of compensating-curve bite-plates I secure a record of the path of the condyles, for the condyles in their movements (while the plates are in contact) coordinate with this compensating curve or curve of Spee.

Right at this time I aim to mark the median line, the lip line, and to mark one or two lines through the buccal surfaces of the upper and lower to serve as guide lines, so that the two compensating-curve bite-plates can be placed in proper relationship one to the other when desired.

After securing accurate compensating-curve bite-plates and marking them for the center of the face, etc., I remove the lower, leaving the upper in place. I now adjust the Snow face-bow to the condyles of the patient's jaws, having the condyle indicating-rods spaced equi-distant in the sleeve carrying same, at the same time having that part of the face-bow which carries the bite already attached to the upper compensating-curve bite-plate.

I now fasten all lock screws on the face-bow and remove from the face. If the upper compensating-curve bite-plate comes out of the mouth readily, I remove it with the face-bow; but if I find it necessary I loosen the face-bow from this plate and remove separately, for I can readily place the bite-plate back upon the face-bow where it was.

After removing the face-bow, bite-guage and upper compensating-curve bite-plate, I transfer them to the articulator. This is done by adjusting the condyle indicating rods of the face-bow to the points on the articulator, by sliding the condyle indicating rods in or out as the case may require, an equal distance on each side, so as not to change the relative position of the right condyle to the median line as compared to the left condyle to the median line.

After face-bow is adjusted to the points on the articulator, place upper model in upper compensating-curve bite-plate and attach to the upper bow of the articulator with plaster. After plaster has hardened remove face-bow and attachments; and place the lower in proper position upon the upper compensating-curve bite-plate, using the median line mark and the buccal lines as guides for this purpose. Place in this lower compensating-curve bite-plate the lower model and attach to the lower bow of the articulator with more plaster.

When the plaster has thoroughly hardened I adjust the condyle paths of the articulator to coincide with the movements of the compensating-curve bite-plates. I do this by loosening the locking device of the condyle path of the articulator and by sliding the compensating-curve bite-plates and models about as the patient did when they were in the mouth. The condyle path of the articulator and the compensating curve of the bite-plate will coordinate of themselves if the locking device has been loosened enough. At this time I tighten the locking device on the condyle path, for we have now secured the upper and lower models in proper relationship with each other, and with the condyles, and we have the condyle path recorded just as it was in the patient.

Now I set up the teeth just as I deem advisable. For shallow ridges I give little overbite; for sharp prominent ridges I give more overbite. I aim to get good articulation so as to get constant compensating-curve contact at all times on the bicuspids and molars, both on the right and left sides, at the same time.

I do not grind the morsal surfaces of my teeth when articulating, but usually wait till after the denture is completed. Then they can be remounted on the articulator by using the compensating-curve bite-plates, for I usually do not destroy these bites until the plates are completed. This is done by getting models from the upper and lower plates and articulating them by using the compensating-curve bite-plates and the Snow face-bow for I retain the measurements on the face-bow and the bite-plates until I have completed my case.

After mounting these models in proper position I place on them my newly-made dentures, and with some carborumdum powder and oil I grind off the small locking bumps by sliding the morsal surfaces of the two plates one in contact with the other, having the carborundum powder and oil between the plates. I grind these plates down until I do not feel an interlocking of the cusps.

In the making of artificial dentures, using a metal base-plate, either of aluminum or gold, there will be no necessity of rearticulating models on the articulator, for the models will not be removed from the articulator; and the plates after being polished, can be replaced upon the models the same as when the teeth were being first set up.

In making metal plates I cast and swage the bases to fit the mouth; altering and swaging them until they fit perfectly. And by waxing up the compensating-curve bite-plates on these metal bases I go through the same procedure as I explained in getting coordinating compensating bite plates.

I feel sure that the compensating-curve bite-plates in use with a face-bow is the only scientific method of mounting upper and lower models on an articulator in accurate relationship with the condyles and condyle paths, *and as the compensating curve has to coordinate with the condyle movements of the jaws I see no other possible way of getting the desired results.*

MASTICATION AND ITS SEQUENCES*

BY JOSEPH LARIMORE, D.D.S., ST. LOUIS

THE relation of the teeth to the body generally has had a larger appreciation in recent years, coincident with the development of other medical subjects, and more especially with the growth of our appreciation of general body relationships. The tendency to specialize in medical sciences has been forced upon us with the growth of medical knowledge, making it impossible for the "jack of all trades" to master any. Yet specialists are in turn being forced by the continued growth of medical knowledge and because of the tendency to seek a correlation of all functions and processes in the body, to acquire a wider and more general knowledge of human physiology and pathology. The specialist now must generalize and the solution to this demand for treatment of the body as a unity is being evolved in hospital or group medicine. It is this change which allows me to ask your attention to a sketch of the frontiers of the intricate and complicated sequences of events in nutritional physiology which is initiated by mastication.

Dental infections which are most prominent among the various focal infections of the body are constantly brought to our attention. Besides the intimate, direct connection to eye troubles, neuritis, and arthritis, there are the indirect influences such as the presence of dental infections so exhausting general immunity that independent infections elsewhere are uncontrolled. I have recently seen cases of recurrent boils stop immediately with the relief from apical abscesses. Then again the disturbance due to teeth may be purely reflex as is the effect of painful mastication upon the secretions and stomach, and as the effect of improper mastication due to poor occlusion or painful teeth upon the digestive process. Pus carried from the teeth into the alimentary canal is chiefly harmful because of its bacterial content, and this is usually well taken care of by the acid secretion of the stomach, which will always inhibit growth because of its reaction, and will usually kill and destroy the organism.

Dental hygiene varies in different countries. With us it is certainly proportional to the social level and the personal culture of the individual. Personal economic considerations have their influence. It has always seemed to me in handling the indigent classes in the dispensary and elsewhere, that no one thing would add so much to their health and morale as instruction and experience in mouth cleanliness. I have been interested in ways of bringing this to the attention and consideration of patients. With many it can be done through shame of their neglectfulness. The factory girl will sometimes be made to see that this neglect mars her otherwise effective makeup. With the laboring man I often have used a very crude comparison to other matters of the toilet. It is questionable whether this has any permanent value, although it certainly does arouse their attention at the moment.

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*Read before the St. Louis Society of Dental Science on April 19th, 1921.

Mastication is discussed in a recent physiology in the following brief sentences:

"By the movements of the lower jaw on the upper, the two rows of teeth come together so as to serve for biting or crushing the food. The resulting comminution of the food forms the first step in digestion. The up-and-down motion of the lower jaw results in biting by the incisors, and after the mouthful has been taken, the side-to-side movements enable the grinding teeth to crush and break it up into fragments of the proper size for swallowing. The most suitable size of the mouthful is about 5 c. c., but this varies greatly with habit. After mastication, the mass weighs from 3.2 to 6.5 gm., about one-fourth of this weight being due to saliva. The food is now a semifluid mush containing particles which are usually less than 2 mm. in diameter. Some, however, may measure 7 or 12 mm."

"It cannot be too strongly insisted upon that the act of mastication is of far more importance than merely to break up and prepare the food for swallowing. It causes the food to be moved about in the mouth so as to develop its full effect on the taste buds; the crushing also releases odors which stimulate the olfactory epithelium. On these stimuli depend the satisfaction and pleasure of eating, which in turn initiates the process of gastric digestion."

The alterations of mastication are not discussed. The effect of poor occlusion on food particles is obvious. Painful teeth will limit mastication, and thus throw an additional burden upon the digestive function of the stomach, and pain will influence the selection of food and allow gross dietetic error to arise. Hard, brittle and crisp foods have a fascination for all. Crispness is the one factor which makes fried foods preferable, although the savory taste, usually associated to crisp foods, is desirable and has its important influence upon gastric digestion, which will be mentioned shortly. The noise of masticating crisp and hard foods is limited to the individual, especially if the mouth is closed. The noise occurs by bone conduction to the hearing apparatus and not by air waves.

The habit of rapid mastication affects digestion both by introducing improperly large particles into the stomach and in limiting an important stimulation to gastric secretion. Large particles require longer for digestion and remain too long in the stomach. The secretions of the mouth vary with the character of the food. Dry or acid foods increase the water content of the secretion. Roughness will increase its mucous content. The effect of diet upon the evolution of the teeth appears surprisingly small. Dentition has followed the same evolutional plan in all the mammalian classes, the same in herbivora as in carnivora. The form of the jaw seems to have been more responsive to food mastication.

Motility or movement of the food through the gastro-intestinal tract has a variable time element, according to the individual. We have found that the normal condition has a wide range and not an invariable point. This range of activity of the stomach and intestines corresponds with other variable factors in the individual. The general physical build of an individual determines the activity of his gastro-intestinal tract, not alone the activity, but also the secretory functions. This latter, however, has not been so well worked out. I use the word "determines," not in the sense of cause and effect, but rather in the sense of correspondence. An individual of certain physical architecture will have a correspondence of alimentary motility. Our anatomies and physiologies have given us a single picture of the stomach, its shape, size and activity, but with the X-ray we have studied its relations in the living, normal and pathological, and have had its normal variations forced to our attentions as essential to judging the pathological alterations of size, shape, position and activity. In these studies individuals have been classified into four main types of physical habitus, the hypersthenic, or broad and massive; the sthenic, or powerful; the hyposthenic, or strong, and the asthenic, or weak type. The hypersthenic type is the gorilla man, broad shoulders, powerful muscles, box-shaped or broad, short and deep chest, with the abdomen showing an angle at the ribs which is very obtuse or almost horizontal, and with the pelvic bones so close together that they may be spanned with the hand. It is obvious that the greater room in this man's abdomen is above the navel. His abdominal organs could not drop, because there is no space into which they might go. His heart corresponds. It is large and horizontal. The muscles of his stomach and intestines are relatively as powerful and tonic as are the muscles which stand out so prominently over his shoulders. His stomach is high. X-rayically, we call it a steer-horn stomach. It takes a curved direction from the left to the right, without having any pendent portion. It is relatively short in length, but has great width and depth. Normally food does not stay in this stomach over two hours, and the entire passage of the gastro-intestinal tract will occur in eighteen hours.

At the other end of the classification is the asthenic. This type is more characteristic of the female than the male. There are the narrow shoulders, flat, narrow and long chest, with the angle of the ribs very acute, being often of 25 or 30°, but the pelvic bones far apart, exceeding the span of the hand by two, three or even four inches. The heart hangs or is vertical. It was long called the dropped heart of tuberculosis, but is now recognized as a natural condition, characteristic of the weaker type, which so easily acquires tuberculosis; and it is neither a cause or result of the disease. It is obvious that the capacity of the asthenic abdomen is below the navel. The stomach and the entire gastro-intestinal tract shows the same correspondence to muscular tone as the skeletal muscles. They may, however, be in somewhat better condition than the skeletal muscles, because their exercise is usually less neglected.

The stomach of this individual is characteristically what we call the fish-hook stomach. It is long, has a large pendent portion, and its lower end curves upwards as a fish-hook. Its horizontal dimensions, width and depth, are small. Its length is great. To have capacity, it must hang into the lower abdomen. Normally it belongs in the pelvis. It is not a fallen stomach. It does not normally empty itself for from five to six hours, and the entire passage of food through the gastro-intestinal tract in this type is from 36 to 48 hours.

Of the two types which I have described, the first is characteristically the male type, and the second, the female type. The asthenic female type is more common than the hypersthenic male. These extreme types are the exaggeration of the two other chief types which lie between, the sthenic and the hyposthenic types, which include the majority of all people. Here again the sthenic type and the hyposthenic type are respectively made up chiefly of males and females, although with many exceptions. It is impossible to put all persons clearly and distinctly into one of these four types, because of the great blending of physical characteristics. But with a careful study of all characteristics, external topography and visceral shape and tonus, most persons can be accurately placed into one or the other class.

These characteristics are purely those of type and are as much a part of the type as is the size, shape and position of the alimentary organs and of the heart. These types are of fundamental importance. In physical and X-ray studies of the alimentary tract, a full appreciation of them is essential to judging the alterations that may occur through the effects of disease. A high stomach or an active stomach which would be normal for the strong types would be pathological when found in the weak types, and *vice versa.*

These are the fundamental underlying factors in the motility of the tract. It is afterwards also influenced by the kind of food. Certain foods are disastrous because of the time element of their digestion, and not because of any chemical considerations. The sthenic can usually eat anything and often boasts of the ability to do so. His fundamental strength overcomes any delays due to the kind of food. The asthenic is troubled by this and that, one time one thing, another time another, mixed foods especially, as they are the most difficult of digestion and remain in the stomach a long time, and, as was said above improper mastication extends the time of digestion to the improper limits. With a normally slow stomach, the superimposed delay due to digestion time of the food may be sufficient to allow unnatural fermentative changes, or to prevent the stomach emptying completely at night, and it therefore secures no rest. Rest for the stomach is a very great factor in the relief of dyspepsia. Even the normal hearts rests twice as much as it works. The rapidity of digestion depends upon the efficiency of the digestive secretions. The secretions seldom lack in chemical potency. Their occurrence is often improperly timed to the taking of food and to its amount.

The first secretion of the stomach is stimulated and occurs with the act of mastication. It is also stimulated by various factors of the diet. The pleasurable taste and crackling of food between the teeth reflexly give a copious secretion of gastric juice, called the appetite secretion. Unpalatable food or undesired food lacks in this stimulation. A raw egg, unless there is a cultivated relish for it, will take longer of digestion than a lightly cooked and seasoned egg, because of the difference in the gastric secretions excited. The palatable, cooked and seasoned egg helps to cause its own digestion. It has been shown that gastric secretion continues very actively during mastication and begins to diminish when mastication has ceased. The conclusion is obvious, then, that poor mastication, besides offering the stomach poorly divided food, allows for a diminution of essential secretions.

The accepted chemical types of food, fats, proteins, and carbohydrates are so well known that even the laity can talk about them more or less fluently and can conjure more questions than the science of nutrition will be able to answer for a long time to come, if ever. This education of the laity is very valuable. They need more of it, and it needs to be extended to the poorer classes, to whom it would give the greatest benefit in their table economies. These three classes of food supply the energy-output of the body, and they can be mathematically handled. One gram of protein or one gram of carbohydrate produces each four calories, and one gram of fat producing twice as much as either, or nine calories. A calorie is the unit of heat required to raise one liter of water one degree centigrade.

Mineral foods do not enter into the energy balance of the body, but belong chiefly to its architecture. Water is too often neglected in considering diet. Its relation to the fatty deposits is generally misunderstood by the laity. They would not drink water at their meals because it makes them fat or it makes them lean. So far as the water itself is concerned, it will, taken at any other time, assist in building fat just as promptly. The absence of water intake at meals limits fat deposits only because the absence of water or other fluid limits the food intake.

The water economy of the gastro-intestinal tract is of the highest interest. During twenty-four hours there is secreted in the gastric juice, in the bile, in the pancreatic secretion, and in the intestinal secretion very nearly three quarts of fluid. If this were lost to the body along with the water lost in urine, perspiration, and in water vapor of expired air, we would have little time for anything but drinking to make up for the loss. A large part of this fluid is re-absorbed from the small intestine as the solvent for the many products of the digestion of the foods. The rest of it is re-absorbed in the ascending portion of the large bowel, and of this large quantity of water secreted into the gastro-intestinal tract very little escapes, and we need to make good little more than the true excretory losses. Nevertheless the intake of fluids is sadly deficient in our general routine of life, and would be wholly inadequate if we did not usually consume a large quantity of fluids at our meals.

The earlier researches in nutritional chemistry pursued an analytical method of pure chemistry. Proteins were broken down into their constituent parts, the animo acids. Of these there are eighteen. They are the building-stones of animal protoplasm. Not every protein carries all of these building stones. Gelatin is sadly deficient. It lacks among others two of the sulphur-containing amino acids which are essential to growth and reconstruction of animal tissue. It is, therefore, not a protein upon which growth and work can be maintained. Its amino acids are available to the body and used by the body if an adequate supply of the deficient building-stones is derived from another source. Fats have been analyzed and classified according to the various fatty acids entering into their makeup. Carbohydrates have been hydrolyzed, and we may know all the various sugars which may result. All the various foods and food substances have been burned in a calorimeter, and their heat production measured, and we know exactly how much heat they will produce with complete combustion. Upon these pure chemical methods the science of nutrition bases its first and greatest impulse, but there have arisen questions which could not be answered by this method. Mere consideration of these obvious chemical relations did not solve all the problems. The relation of scurvy to diet early called attention to a factor which could not be isolated chemically and seemed independent of the laws of oxidation and energy transformation. From the study of these things grew a different method of analyzing foods, and nutritional studies have progressed, or rather enlarged into the biological analysis of foods. In this method the experiments consist of extended feeding to groups of animals, combinations of purified foods, noting the difficulties and improvements with variations in the types, kinds, and amounts of food in this purified diet. It is by this method that the deficiencies of the various proteins and facts concerning the so-called vitamines have been worked out.

A positive definition of a vitamine cannot be given. It is not known. They are known by what they do and by their associations. A vitamine is an accessory food factor, which does not give off energy, and its exact chemical nature is not known, nor is its mode of action. It may be compared to that class of chemicals which we call catylases, and which by their presence stimulate chemical activity, while they themselves are not altered nor diminished in quantity. The animal and human body cannot manufacture vitamines. The yeast cell and plant cells only can form them. The animal and human body cannot store vitamines, although the active supply clings to the tissues sufficiently long that carnivorous animals obtain them from the meat they eat. Milk contains vitamines only in proportion as they are present in the diet.

There are three known vitamines: the anti-scorbutic or scurvy vitamine, the water-soluble B, or anti-neuritic vitamine, and the fat-soluble A, or anti-rachitic, vitamine. With an adequate supply of all other factors, fats, proteins, carbohydrates, minerals, and water, experimental animals will not grow to adult life normally, nor will adults continue in proper nutrition, unless these vitamines or accessory food factors are added.

The anti-scorbutic food factor has been known for a long time. The fundamental change in scurvy is a dystrophy of the tissue cells lining the blood vessels. This produces the characteristic symptoms seen in the disease, namely: the spongy, fragile gums, the small hemorrhages in the skin and the covering of the bones, allows for the appearance of blood in the urine, and circulatory disturbances with rapid and enlarged heart. However, these symptoms do not need to be full-blown for the disease to cause serious disturbances. The sub-clinical or latent stages of the disease are serious menaces in the presence of true bacterial or traumatic processes. It was particularly noted by the British in Mesopotamia that pneumonia and wounds did not heal well in troops subjected to this deficiency in diet, although the deficiency had not yet manifested typical symptoms in those patients. About six months of an inadequate diet is necessary before clinical manifestations are definite.

Water-soluble B is the anti-neuritic or anti-beriberi vitamine, and is very widely distributed. The absence of this vitamine causes a neuritis which was first noted as occurring where milled or polished rice was eaten and not where the unmilled rice was used. The germ and pericarp contained the vitamine. The same is true of other cereal preparations, and when the germ and coverings are discarded the vitamine goes. White bread is lacking in this factor and rye bread is rich in it. Yeast contains a very large amount of this factor and it is upon this fact that the current fad is based.

Fat-soluble A or the anti-rachitic vitamine, is important medically because of its association with rickets. Without this factor growth ceases and death will ensue. It has to do with the metabolism within all the cells. Its deficiency diminishes immunity and promotes bacterial disease.

The anti-scurvy vitamine is present in growing green leaves, in fruits, and in germinating seeds, and not in dormant seeds or dried leaves. Heating destroys it except in the presence of acid, and it is therefore not present in canned vegetables other than tomatoes, but is present in canned fruit.

The anti-rachitic or fat-soluble vitamine is present chiefly in animal fats and in green leaves, and is absent from vegetable oils. It resists high heat for a short period but is destroyed by moderate heat over a longer period. Cod liver oil was used for a century, but is not yet generally recognized as beneficial because of being rich in fat soluble A, and being a preventive of rickets.

The discovery and work upon these nutritional factors is a very brilliant chapter in experimental medical science. The application of this knowledge is not following so rapidly. It is problematic. Until we have ways of measuring these deficiencies before they become acute and manifest, the application of treatment will be hit and miss. The current fad for the use of yeast is such a hit or miss attempt to apply our inadequate knowledge of the vitamines, which causes us to realize that the good results accruing from some old dietetic principles, such as the large intake of greens and vegetable and fruit foods, are greater than that due to their cellulose residue and mineral content.

Metabolism obeys quantitatively the chemical laws of oxidization. For a certain amount of oxygen used the body develops a corresponding amount of energy and produces a corresponding amount of carbon dioxid. Methods of measuring the rate of this energy production are of two kinds: The direct method by which the heat is measured in calories as it is produced, and the indirect method by which the amount of used oxygen or resulting carbon dioxid is measured.

The use of these methods in studying energy transformations in the human body has been employed for the last quarter of a century, and numerous data have been accumulated from which we are now able to predict by formula the normal amount of energy which the mere passive existence of an individual produces. This we call the basal rate of metabolism. It is that rate of oxidation which allows for only the vital functions of the body. One can almost directly compare this to measuring the air-stream or draught through a fire-box which may vary from a basal quantity which will barely hold the fire to that of active violent combustion, which will provide live steam and energy. To measure the basal rate of metabolism it is necessary to have the subject twelve or fourteen hours without food or drink and in complete repose to eliminate digestive and muscular energy-production. And then from the amount of oxygen they may consume in a definite period of time as measured by stop watch, and considering certain experimentally determined factors for body weight, height, and age, and making the corrections in gas volume, for temperature, and barometric pressure, we may arrive at the measure of the subject's metabolism at the time examined. This is very accurate.

The foods which supply energy are carbohydrate, protein, and fat. The body must expend much energy in digesting these substances. In the terms of the efficiency engineer this may be considered the cost of the digestion. By the mere taking of carbohydrates into the gastro-intestinal tract the metabolism is raised above the basal rate by a maximum of 25%, and this continues for several hours, giving an average rise of 5%. Protein causes an increase of even as high as 45%, and averages a 12% increase. The fat causes a maximum increase of 12% and averages only 2%. A mixed diet will reach a height of 40% and will average 6%. Our ordinary daily diet then costs us 6% of its energy-value as its cost of digestion. Merely standing upright will cause an increase of metabolism or energy output of 10%. Chewing alone, that is the work of mastication, will cause a rise of metabolism of 17%. This is interesting in consideration of a recent fad in dietetics known as Fletcherism or prolonged mastication. With ordinary mastication it has been determined that the digestibility of foods is 90 to 95%. It is obvious that to save this wastage of 5-10% it would not be economic to increase our metabolism or output of energy by 17%.

It is by the use of these methods in studying metabolism or energy-production that we have learned the quantity of food required by the human body in its various normal states of repose and activity. We are now beginning to use the same methods in studying altered nutritional conditions. One of the chief things which cause an alteration in the rate of a patient's basal metabolism is the activity of the thyroid gland. Active goitres may increase it to the dangerous level of being twice normal, or 200%. Inactivity of this gland may reduce it to even 60%, or 40% below normal, when the body barely exists and the mental function is depressed to a stupidity that is pitiful. The Cretin child is in this condition. The administration of thyroid gland may be accurately controlled by metabolism rate study. Other of the so-called ductless glands have influence upon the rate of metabolism, but our knowledge is not yet sufficient so that we can draw positive conclusions, as are certain in the case of thyroid gland.

The increase of metabolism caused by the ingestion of food is more than is due to mere work of the alimentary tract in handling that food. It specifically stimulates metabolism and the body is on a higher plane of energy development. This has been called the specific dynamic action of foods. All food is, therefore, a stimulant.

This short paper has attempted to give you a sketch of the course of digestion and nutrition, and especially to sketch some of the recent achievements in nutritional science. The application of these new facts is very helpful in certain instances, but their full application is still problematic and remains for future development. It is not improbable that in your future study of the teeth you will note nutritional troubles depending upon the accessory food factors. It is a fundamental biological law that the more highly specialized tissues become the more susceptible they are to diverse influences. Certainly the teeth are highly specialized structures.

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423 University Club Bldg.

PEDIADONTIA*

BY JAS. F. AUSTIN, D.D.S., ST. LOUIS, MO.

THE progress made by the dental profession in the last twenty years has been phenomenal. The up-to-date dentist of today realizes more fully the responsibility which is now placed upon him in keeping up the physical welfare of this great human race. The public at large is looking up to and depending on the dentist more and more every day.

The great interest now evidenced in dentistry can be attributed to the remarkable discoveries regarding focal infection in the mouth, as related to general ailments.

In this age of enlightenment, can you believe that only about twelve percent of the population patronize the dentist? With the strides made in our profession, and with dentistry getting upon an increasingly higher plane every day, repair dentistry seems to be foremost in the minds of the greater majority of the profession, and preventive dentistry still dormant.

Let me suggest that the sooner we awake to the fact that a perfect tooth will perform its functions quicker and better than a repaired one, just that much sooner we are going to be on the right track, and then we will be doing more for the general welfare of humanity.

I believe in specialization. Other professions have been specializing for many years. Dentistry is as important as any of them. There is no man who can be an expert and proficient in everything pertaining to dentistry.

The newest and most inviting field in dentistry to me is

PEDIADONTIA

Pediadontia is a word derived from two Greek words, pedia, meaning child, and dontia, meaning teeth—child's teeth. It was coined by my friend, Dr. Philip Thomas, of Minneapolis.

This is a work which includes both repair and preventive dentistry, but I believe the time will come when it will be mostly preventive.

Dr. Thomas says: "While great progress has been made and great interest awakened throughout the country relative to the care of the child's mouth, there are greater things to be done and greater problems to be solved." Here are some for your consideration:

First—Why, in a family of children by the same parents, all eating similar food, drinking the same water, and living under like conditions as to the use of carbohydrates, etc., does one child have a high immunity against caries, and another suffer severe damage from caries?

Second—Is there a protective element in the saliva, controlling immunity?

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*Read before the St. Louis Society of Dental Science.

Third—Can a medicament be found and used as a preventive of caries?

Fourth—Can a better instrument than a tooth-brush be devised to protect the teeth from caries?

Fifth—Can caries be prevented through diet?

Sixth—Will the best preventive of caries be found in highly mechanically polished enamel surfaces?

Seventh—What effect does diet have on developing tooth structure, and can a proper diet be devised to produce good normal tissues?

Eighth—Does focal infection in the child's mouth do as much or more damage systematically than the same condition in adults?

These are the problems in which we all should be very much interested, especially focal infection, as it is without doubt the most prevalent disease of children and should not be considered lightly. It has been proven without a doubt that any child with an abscessed tooth or a putrescent pulp in its mouth is a great deal more susceptible to physical ailments than one who has a clean, wholesome and healthy mouth.

Therefore, I feel that much more serious damage may be done by permitting these teeth to remain in the mouth than could be done by any irregularity in the alignment of the permanent set, caused by early extraction of the deciduous teeth.

The things to be considered in the practice of pediadontia:

First, General Health of the Patient—

When we say general health of the patient we do not mean just at the time of the examination, but for the rest of its life, and we want to state emphatically that we are in position to do more for an individual between the ages of two and thirteen years than at any other time.

When examining the child we take into consideration its general health, as we are in position to suggest to the parents things which they may do for the little patient which will be of great benefit. Many times we can see just at the first glance that the patient is a mouth-breather, which would indicate trouble somewhere; adenoids, enlarged or affected tonsils, and either of these may be just as detrimental or maybe more so, than an abscessed tooth or a putrescent pulp. Any abnormal condition which may carry infection into the child's system, must be considered, and we must have such conditions eliminated before we can expect to gain the desired results with our treatment.

Dr. Pike, who is considered one of the best orthodontists in this country, will not try to correct irregularities of the teeth until the patient has had the adenoids or tonsils removed. Anyone of these things may cause heart lesions, rheumatism, neuritis, endocarditis, or numerous other ailments.

Second, The Environment Must be Taken into Consideration—In our individual practice we are not in position nor do we see many cases where we may suggest something which might be done for betterment of the general health of our patient. But in clinical cases many times, by asking questions regarding the environment of the child, we can suggest things which should be done, and many times we gain our point, and the little one is much benefited. Many times the environment of a home is greatly improved by our suggesting one thing or another which the parents did not know about, and are quite willing to do as soon as they learn better.

Third, The Age of the Patient—If the responsibility is to be placed on our shoulders, we would much prefer to have a child in our care at the age of two years and not later than four. This gives us a chance to practice preventive and not repair dentistry, and the sooner we educate our adult patients to this fact, just so much quicker will their children receive the benefit of their education, and therefore the people of this nation in years to come will derive the benefit, as it will be depending on these children after we are dead and gone. May we never miss a chance to impress upon the minds of the father and mother the importance of caring for the child's teeth in early childhood.

Fourth, Diet—This is the most important factor. A child with a perfect set of teeth will be able to masticate almost any kind of food so the digestive organs may take care of it. But a child with a mouth full of decayed teeth cannot masticate the food properly. Therefore the proposition of diet confronts us and should be carefully considered, in order that the child may derive the most benefit from the food which is given to it.

Fifth, Chance of Focal Infection—If by chance the patient has been unfortunate enough to have had a dentist try to treat and fiill the canals of a deciduous tooth or teeth, they should be X-Rayed immediately and see if any diseased tissue exists. If so, they should be at once removed, and we should not even try to save them, for if we do we are adding grief for ourselves and injury to our patient.

Sixth, Gum Tissues—If the patient is physically normal, you will find very few cases where the gum tissue is not normal. Sometimes you will find an interproximal space where the teeth have separated enough to allow the food to crowd on to the gum and cause soreness. This, however, is easily cared for.

Seventh, Maintaining Spaces—When a tooth is extracted, space maintainers are made and adjusted in a manner which will hold the teeth in the relative position, therefore preserving the space.

Eighth, Prophylactic Treatment—In order to properly care for the child the dentist should see the patient at least once every month, giving a thorough prophylactic treatment each time, keeping the teeth thoroughly polished, rubbing copper cement into the sulci of the newly erupting teeth, thereby keeping the food from lodging in the crevices and rough enamel. All teeth should be carefully examined for caries, and if any cavities are found, they should be filled, no matter how small.

MATERIALS USED FOR FILLINGS

In deciduous teeth there is nothing better than copper cement for fillings., black copper in the posterior teeth, and Smith's copper in the anterior. Alloy is sometimes indicated when the child is not able to visit the dentist at regular periods, so the tooth can be watched. Alloy will sometimes wear longer, but never will it retard the progress of decay as will the copper cement, with a very small amount of nitrate of silver mixed with same. So we use alloy only when we think the case indicates such treatment. Gold is used only for bands or little temporary crowns.

As an inspiration and incentive to greater efforts for better things for the children from a dental standpoint, I would like to indelibly impress upon the minds of everyone here, the importance of this class of work. And in closing, I would like to emphasize that the hearty co-operation of every member of the dental profession is needed to help educate the parents for the sake of the children.

Pediadontia in general practice, when properly and efficiently practiced, means that dentistry is performing its proper function in the upbuilding of this great nation.

A normal mouth that is kept in proper condition with the teeth thoroughly cleaned and polished, is a splendid health insurance, and should be carried by everyone.

University Club Bld'g.

IMPORTANT FACTORS IN THE CONSIDERATION OF SCIENTIFIC CAVITY PREPARATION*

BY DR. J. A. McCLUNG, WINSTON-SALEM, N. C.

IN COMPLIANCE with the request of your committee to contribute a paper at this meeting, I shall endeavor to present for your consideration a few of the important factors in the consideration of scientific cavity preparation.

Scientific cavity preparation is a big subject, one which embraces a thorough knowledge of the anatomy and histological structure of the teeth and surrounding tissues as well as mechanical principles. However, we shall not attempt to go into the anatomy and histological structure of these tissues, but merely mention some of the fundamental principles in this phase of operative dentistry.

It is with regret that we see in every-day practice conditions existing in the mouths of our patients which are due in a great many instances to faulty cavity preparation. So let us turn our thoughts back to our college days for a short time and try to recall some of the important things which we were taught by our professor of operative dentistry in regard to scientific cavity preparation.

The subject which I have selected is one which carries with it a great deal of meaning, and requires knowledge, art and applied skill in order to make cavity preparation what it should be, so that the filling or restoration may be retained and the life and usefulness of the tooth preserved and the surrounding tissues remain in a normal condition. It is when a cavity is presented to us for its first filling that we become responsible for the future of that tooth; and on our knowledge and skill its usefulness or ultimate loss is directly dependent. Have you ever asked yourself the question, "How can I most nearly restore the lost tooth tissue and preserve the usefulness of this tooth throughout the life of this patient?" It seems to me, as we observe cavity preparation from its several viewpoints, that no answer will suit nearly so well as that of scientific cavity preparation, and especially that of extending the cavity margins into an area which is self-cleansing, or the immune area. Assuming, of course, that the operator uses good judgment in the selection, manipulation and insertion of the filling material best suited for the case and the finishing and polishing of same in the different classes of cavities. Since a chain is no stronger than its weakest link, therefore I think the operator who desires to render with his labor the greatest service to his patient, always will endeavor to prepare all cavities in a scientific manner with due regard to the position of the pulp, the histological structure of the tooth, and especially the angles at which the enamel rods run; also the stress which that filling will have to bear. Much of the knowledge of what we now consider to be correct cavity preparation we owe to the work of Professor G. V. Black, who has analyzed the conditions which predispose dental caries, and has studied out the best methods of preparing the various classes of cavities to secure the proper outline, resistance, retention and convenient forms in order to guard against recurrence of dental caries or the dislodgment of the filling, and at the same time make our operations more simple and on a more scientific basis.

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*Read before the North Carolina State Dental Society.

According to Professor Black, all carious cavities are classified according to their mode of origin, as, *first*, pit or fissure; and *second*, smooth surface cavities; and that either of these may be simple or compound.

We shall first consider the pit or fissure cavity. Cavities of this type are found upon the palatal surfaces of superior incisors, the occlusal surfaces of molars and bicuspids, or the buccal surfaces of molars, and occasionally on the lingual surfaces of inferior molars and the palatal surfaces of superior molars where pits or fissures are there present. The outline form of these cavities must envelop every groove or fissure, having the cavo-surface angle beveled and perfectly smooth and presenting a sharp angle. This will, of course, enable us to polish the filling smooth and even with the cavo-surface angle at all points, leaving no uneven points for the lodgment of food particles which would cause recurrence of decay or gum irritation.

Next, we shall consider smooth surface cavities. This class of cavities first begin on smooth surfaces which are not kept clean, or where opportunities offer for the lodgment of food. It is in this class of carious cavities that we must pay special attention to that step in cavity preparation wherein we endeavor to secure proper outline form by placing our cavity margins in zones of comparative immunity. The classification I have adopted is such as will enable us to study the outline form of each according to their location and mode of origin, which are as follows:

Class 1. Cavities in the gingival third of buccal, labial and lingual surfaces of teeth.

Class 2. Simple proximal cavities in anterior teeth.

Class 3. Compound cavities in anterior teeth.

Class 4. Simple proximal cavities in posterior teeth.

Class 5. Compound cavities in posterior teeth.

Under the head of class one, we find the buccal and labial surfaces affected more often than the lingual surfaces and the decay tends to follow along the free margin of the gum, usually stopping, however, before reaching the proximal angles. These facts should be borne in mind in extending the outline form of such cavities in order to prevent recurrence of decay. If the outline form be extended to or near to the proximal angles and beneath the free margin of the gum, the chances of recurrence of dental caries are much lessened. Just why this extension of the proximal angles and beneath the free margin of the gum places the margins in zones of comparative immunity has never, to my knowledge, been satisfactorily explained; however, clinical experience seems to indicate that such areas are comparatively immune. In carious cavities of this class little or no extension toward the occlusal or incisal beyond that of sound tooth structure is required.

In class two, or simple proximal cavities in the anterior teeth, I think of the many propositions confronting the general practitioner, the one dealing with the shaping, filling and finishing of the gingival portion of these cavities has the most important bearing on its success. Clinical experience has likewise shown that the point of recurrent caries around the filling in cavities under consideration is almost invariably situated at or near the gingival margin. The favorite point seems to be at the labiogingival and lingogingival angles.

There are three causes in the deficiency of fillings at this point, any one of which might be the result of recurrent caries. They are, namely:

First, improperly shaped outline of the gingival third of the cavity.

Second, walls improperly-shaped and with incorrect relationship to each other; and

Third, the nature of the filling material and the method employed in its introduction. We shall consider only the first cause. Therefore, in order to obtain the best results in permanency of these fillings the outline form of these cavities must be extended gingivally to get the protecting influence of the gum margin, and labially and lingually in order that these margins may be free from contact and be exposed to the action of the tooth brush and of food passing over them; and lastly, towards the incisal edge and beyond the approximating contact point where this margin, too, will be subjected to the cleansing action of food passing over it.

Whenever the susceptibility to caries is great, cavities should be extended to such outlines, but there may be and frequently are conditions which would preclude the more radical or ideal methods of outline form. The age of the patient, the general tone of the pulp, the condition of the oral secretions and of the mucous membrane, the sex and occupation, esthetic consideration and tendency to susceptibility or immunity, the shape and environment of the teeth, the habits of the individual in the care of the oral cavity, and various other factors perhaps must be taken into consideration before deciding whether or not to extend these cavities in the manner above described. It has been said that the condition of the patient to be able to tolerate the pain in such extension must also be considered, but since we have conductive anesthesia at our command, this is no longer to be considered.

For esthetic reasons we endeavor to avoid too much extension in the labial direction in cavities in the anterior teeth, and especially if the fillings are to be of gold; but under certain circumstances esthetic purposes are best served by greater extensions.

Class four. Compound cavities in anterior teeth involve the same fundamental principles as far as outline form is concerned from the standpoint we are considering. Further extension than was mentioned under class two is merely to serve as the outline of the resistance form.

Class three. Simple proximal cavities in posterior teeth can be dismissed with a few words, since we seldom fill them as such. As a rule, these cavities are extended in such a manner as to make them compound instead of simple ones. Hence, we shall take up the fifth and last class, compound cavities in posterior teeth.

Like those of the anterior teeth, they are present in many different forms. We shall endeavor to study the most common variety, which is known as the proximoocclusal type. In studying the proper outline form of these cavities, we must pay special attention to the margins in the proximal portion, endeavoring to locate them in zones of comparative immunity. The crevical margin, too, must be extended gingivally and placed beneath the free margin of the gum. The buccal cavo-surface angle and the lingual or palatal cavo-surface angle must be extended well out to the angles of the tooth where these margins may be cleansed by the action of the tooth brush, food and tongue. As we approach the occlusal surfaces all fissures and grooves must be followed and enveloped in the outline form, having these margins slightly beveled, leaving a perfectly smooth occlusal cavo-surface angle so that our filling, when completed, may be polished absolutely smooth and even with the margin at all points.

We know that with the ideal outline form we might give any one of the classes of cavities mentioned, we cannot expect results from our filling if the resistance, retention and convenience forms are not properly made. Assume that these forms are thoroughly understood and applied in a scientific manner, together with the ideal outline form and the selection and correct insertion of the filling material best suited for the cavity, after which the normal grooves and sulci are carved and the filling polished absolutely smooth and even with the cavo-surface angle at all points and at the same time preserving the normal approximating contact point. Then I think we can conscientiously feel that we have rendered to our patient in restoring the lost tooth tissue the most scientific service known to our profession.

ADENOMA OF MUCOUS GLANDS OF MOUTH, AND MACROCHEILIA*

BY EDWARD H. HATTON, M.D., CHICAGO, ILL.

ENLARGEMENTS OF THE LIPS produced by disease of the mucous glands are uncommon, and are either inflammatory or neoplastic in character. Volkmann,[1] in 1870, under the name of myxadenitis labialis, or cheilitis glandularis apostematosa, described five cases of a chronic inflammation of the lip mucous glands; all the patients were adults, three had syphilis, and the process was long drawn out with frequent exacerbations. The mucous glands were palpable, the gland ducts frequently dilated, and small cysts or abscesses common. Stomatitis or gingivitis was present to a noteworthy degree in every case, and Volkmann believed that the gland involvement was due to the mouth infection and that syphilis, when present, was a factor of only secondary importance.

Eichhorst[2], in 1893, under the title of "Elephantiasis Syphilitica der Lippen," described an enlargement of both lips in a man involving the mucous glands with the other lip tissue. Thimm[3] had a case of machrocheilia caused by a syphilitic involvement of the lip mucous glands in an adult which he believed to be purely syphilitic. It is unique not only because of this, but also because it concerns a woman and that it is the first time the term macrocheilia was used to describe syphilis of the lips. The lips were uniformly swollen, the mucous membrane intact, and even considerable pressure was not painful. The enlarged mucous glands were readily palpated, and the dilated gland ducts could be probed for short distances. There was no inflammation of the mouth mucous membrane except for a slight gingivitis. Complete disappearance of these conditions followed treatment for syphilis. Rousel's[4] case of cheilitis gland-

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*Read April, 1920, in the Section on Stomatology (Amer. Med. Asso.), of which, by special arrangement, THE DENTAL SUMMARY is the representative organ for the dental profession.

*From the Department of Oral Surgery, Northwestern University Dental School.

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[1] Volkmann: Virchow's Arch. f. path. Anat., 50: 142, 1870.
[2] Eichhorst: Virchow's Arch. f. path. Anat. 131: 568, 1893.
[3] Thimm: Deutche med. Wchnschr. 21: 389, 1895.
[4] Rousel: New Orleans M. & S. J. 58: 739, 1906.

ularis, the name and identity of which he obtained from Stelwagon's Diseases of the Skin,[5] is like Thimm's. It occurred in a white man, aged 36, with bad teeth, syphilis and enlarged lip mucous glands, with occasional small ulcers. This likewise cleaned up under antisyphilitic management and the use of the electrolytic needle. Aside from the part played by syphilis and mouth infections in the production of these inflammations of the lip mucous glands, it was assumed by the earlier authors that the so-called scrofulous constitution was an important factor. Nowhere is there any mention of tuberculosis.

A more frequent enlargement is that described as "double lip" by the European writers, especially the French and English, sometimes called hypertrophy of the mucous or labial glands. The enlarged soft lip is covered by smooth mucous membrane, with palpable nodules beneath it. The fold, formed by the projecting red portion is more conspicuous when the person is laughing or talking. In the upper lip the fold is divided by the frenum, and the lower is always single.

Edington[6] described two cases and knew of a third, all in young men, first noticed in early childhood. The excised tissue of one such lip was examined microscopically and consisted of mucous glands embedded in a scanty connective tissue without any inflammatory infiltration. Operation yielded very satisfactory results in two cases, in one only after a second excision of glands apparently missed the first time.

Boissen[7] called this condition polyadenoma, and mentioned the occasional occurrence of an inflammatory process, which sometimes went to the length of ulceration.

Miles[8] and Sick[9] each described similar cases involving the upper lip in men.

Wright's[10] case belongs to this group. An enlargement of both lips in a young man, aged 18, had been in existence since birth, and the small tumor masses were distinctly palpable beneath the intact mucous lining. Removal was successfully accomplished after two operations. No microscopic examination was made, and infection was apparently not present.

Fraenkel,[11] in 1892, seems to have been the first to attach the name macrocheilia to lip enlargements resulting from adenoma of the mucous glands, in reporting a case of a man, aged 18, with a marked protrusion of the lower jaw, and a slowly growing tumor of the lower lip first noted by his parents during his fourth year. Some points in his description are important. The lip hung down so as to expose the incisors entirely.

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[5] In the seventh edition of Stelwagon's text (Philadelphia, 1914) there is a summary of seven cases reported by Purdon, Sutton, Howard, Fox, Schamberg and Wise, like those described by Volkmann.

[6] Edington: Glasgow M. J. 64:81-86, 1906.

[7] Boissen in Dechambre: Dictionnaire encyclopédique, 1869, article on Levres.

[8] Miles: Lancet, Part 2, 717, 1892.

[9] Sick: München. méd. Wchnschr. 46:680, 1899.

[10] Wright: New York M. J. 56:152, 1884.

[11] Fraenkel: Arch. f. Chir. 44:95-101, 1892.

The mucous membrane was smooth, intact, without folds, furrows or elevations, and was normally soft without any evidence of inflammation such as pain on pressure and redness. Mucus appeared in small globules on the lining and ran in long strings down the exposed surface. It was diagnosed as lymphangioma, operation advised and accepted, and then in Fraenkel's words, "there occurred an astonishing discovery: At section of the mucous membrane there sprang forth between the incised borders a conglomerate tumor mass stretching from corner to corner, and consisting of a multitude of small lipoma-like masses with delicate lobulations up to the size of a cherry pit." The histology was in complete accord with that of unaltered mucous gland tissue. "The single acini are not hypertrophied, mostly devoid of secretion, none are cystic, the interacinous tissue is not broadened, and the walls of the blood vessels are thin."

Fraenkel was unable to find another case in the literature with the possible exception of Wright's,[10] which he read in abstract. He believed that the mucous gland tumor was associated with and possibly due to the jaw deformity.

Eisendrath,[12] in 1904, described a very similar case in a 16 year old boy involving both lips, most marked in the upper; this lip was divided into two parts, soft, not painful, the lining smooth and without vesicles or dilated vessels. The true nature of the tumor was recognized only after microscopic examination, and consisted of normal lip mucous gland substance without cysts, infiltration, or connective tissue proliferation. This lip malformation was first noticed at ten years, and was associated with a double ptosis of the eyelids.

Lindenberger,[13] Donati[14] and Masera[15] have reported cases of upper lip tumors under the term of macrocheilia, the result of hyperplasia or hypertrophy of the mucous glands.

D. B., a dentist, aged 26, came to the oral surgery clinic of the Northwestern University Dental School with a smooth, soft enlargement of the upper lip. The mucous membrane was intact, the swelling divided into two parts by the frenum, not tender, and without redness of the adjacent skin. There was no history of previous illness, and the condition had existed as long as the patient could remember. He believed it was gradually increasing in size because of his constantly biting the swollen lip. No history of syphilis was obtained, and a Wassermann test was not made. It was diagnosed as lymphangioma and the tumor mass removed under local anesthesia by Dr. Thomas L. Gilmer.

Paraffin sections of the excised tissues stained with hematoxylin and eosin were bordered by an unchanged lining, beneath which were embedded numerous mucous glands. Some of these were without change, others were the site of inflammatory alterations. One had a markedly dilated duct with thickened wall surrounded by a marked small round cell infiltration. The attached gland contained acini varying from perfectly formed tubules to those with dilated walls, and the absence of functioning gland cells. The interacinous connective tissue was increased in amount and contained many inflammatory cells, many round, occasional plasma and eosinophil cells. There were no abscesses and no polymorphonuclear leukocytes.

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[12] Eisendrath: Ann. Surg. 40:320, 1904.

[13] Lindenberger, Irvin: A Case of Macrocheilia, J. A. M. A. 44:959 (March 25), 1905.

[14] Donati: Gaz. med. Ital. 56:71-74, 1905.

[15] Masera: Il Morgani 53:151-160, 1911.

According to the requirements of Fraenkel, this is not a genuine mucous gland macrocheilia, nor does it conform to the purely inflammatory type of lip enlargement. It readily falls into the group of so-called "double lip," with some secondary infection probably resulting from the habit of biting the lip.

Of these nineteen cases, only one was in a female, thirteen involved the upper lip, nine the lower (this included three of both), five of the lower lip class were in syphilitic individuals, and two were of supposed inflammatory origin. Two were associated with trauma, one patient had misplaced teeth, two had other deformities, and six had syphilis. The neoplastic form was found in the upper lip twelve times and the lower three, and began in childhood, if not earlier, almost without exception. There is no statement anywhere connecting these tumors with malignancy. Excision, if extended to include all of the involved glands of this form, has been uniformly successful.

The term macrocheilia, therefore, has been used to name not only the better known lymphangioma but also these unrelated mucous gland enlargements. It is difficult, if not impossible, to classify these conditions on the basis of any such terminology, and it would therefore seem wise to abandon such descriptive terms as macrocheilia and double lip for the more exact names associated with the actual pathologic condition that does exist.

31 West Lake street.

SOME ADVANTAGES OF THE DENTAL CALLING

BY FRANK W. SAGE, D.D.S., CINCINNATI, OHIO

(Written for THE DENTAL SUMMARY)

A HUMORIST remarks, "One of the first things a man marrying begins to find out, is himself, especially if he be an old bachelor." He goes on to picture the victim's impatience with himself for not having had the good sense to let well enough alone.

I am addressing this to the oncoming generation of dentists who may be needing encouragement. You older fellows who prefer to dip your pens in vitriol, and set about showing what a bad lot the young dentists, who haven't the medical degree, are, please step aside.

There comes a time to many men when they doubt whether they have made a wise choice of an occupation. Beyond question many a young dentist comes to feel that the theory of dentistry and actual practice as it presents itself to the dentist at his chair or in his laboratory, are two quite different matters. Occasionally even the brilliant dental prize winner, after a short term of practice, drops out of sight, and is never again heard from. Another, who while in college manifested only a fair degree of interest, made no great record, when he went into active practice managed to hang on, overcame earlier shortcomings, ultimately made even a notable record as a practitioner. How are we to account for these unlooked-for, contrasted outcomes?

The prize student it often happens, proves to be *sui generis*, a college man and nothing more, which fact nobody suspects, not even himself. He may have no practical talent for anything outside of college study and college manipulations. He may be exceptionally gifted as to all mechanical features of practice in the college clinics, furthermore may excel in the more abstruse collateral studies necessary for the full equipment of the dental practitioner, so that his fellow students esteem him a genius, sure to succeed in practice. This same man when he comes to practicing in his own office, before long betrays weaknesses no less unaccountable to erstwhile admirers, his fellow students and classmates, than to himself. Just what is wrong he cannot even guess; he only knows that dentistry has somehow lost its attractiveness for him. He thinks he might better like it if he had such patients as he served at the dental clinic, those who deferred to him, placed themselves unreservedly in his hands, having in truth become just so pliant by reason of having learned he was highly esteemed both by the faculty and the students. He has been living in an atmosphere of approval; now he finds himself it may be, subjected to trial strictly on his merits by patients who never heard of his being applauded, reaping class honors. This fact being half-recognized, irks him a trifle. He seems to himself under a strange incubus, which he vainly tries to throw off by trumping up an enthusiasm he really does not feel. This presently fails; his interest in his office, in practical dentistry, declines: for him the end of it all is near.

This young man is an idealist. While in college the adulation of his fellow students was his food and drink; now that he is withdrawn from association with them, his inspiration is gone. The practical affairs of dentistry as pertained to the college, interested him; now that the familiar associations are missing, he cannot bring himself to accept philosophically, a new set of wholly unfamiliar conditions and demands. In the college he had conditions fitted to him; now he must shape and fit conditions for himself, a something for which perhaps he has no faculty whatever. His family and friends are deeply concerned for him; their disappointment is bitter. He perhaps shares their disappointment, loses courage, wishes he had never heard of dentistry.

Men of this temperament are apt to be variable, desponding. They think others may pluck up a spirit and finally win, but that for themselves there is no hope.

The first year or two in any worthwhile occupation, may be hard, often almost unendurable. School teachers will tell you this is true of their calling. A young lady teaching in a Cincinnati school told me that during her first year she and three other beginners in the same building, used to meet in a room after school, and have a "good cry" over their day's troubles. She laughed in telling of it. Short-hand, for the first year or two a terrible strain on the nerves, becomes second nature, after awhile. Many girl stenographers break down under this strain. The dentist's first year or two in actual practice may be so beset with difficulties as to make him wish he had chosen almost any other occupation. Casting about him he thinks he sees superior advantages in other pursuits he might just as readily have chosen. Not a few young dentists probably would back out, give it all up, after a few months at the chair, were it not for the expense already incurred in getting established in the profession. Some do so anyhow, reckless of such considerations.

Years ago two dentists were discussing their several experiences. One said, in my hearing, "I tell you, Dr. Brown, dentistry is too slow; I am going to try something else." Which he did—I have forgotten what it was, but he amassed a fair-sized fortune at it, a larger one than he could possibly have made at dentistry. I might give his name, but propriety perhaps forbids.

This citation, in view of my present purpose of discouraging such changing, seems a bit inapt, but let it stand. To offset this we all very well know that some who have made the change, have come to cast regretful backward glances in the direction of the once familiar chair, the quiet, secluded laboratory, which seem invested with attractions less regarded before. The later preferred occupation, which seemed superior, has its peculiar drawbacks too, as has possibly been discovered.

Now let us get on. We observe that the dentist, like the physician, sees much of the morbid side of life, goes into partnership, so to speak, with his patients' woes, suffers a drain on his sympathies, which in time affects the stoutest nerves. A lady recently commented on the fact that a certain dentist came into the reception-room where she was waiting, with a tense expression of irritability so repelling, that she made an excuse for not keeping an appointment. I excused him to her as best I could, assuring her she had merely seen him at his worst, when doubtless his nerves were all on edge because of some prolonged strain. As I suspected, it turned out that he had had an afternoon of plagues rivaling the Seven of Egypt, and was about "all in," when the lady called. Ordinarily he was a thoroughly genial, likable fellow, beloved of his confreres and his patients.

It might be suggested, in passing, that the dentist give due attention to avoiding the bunching together of three or four excessively nervous patients. Slide in one or two of the nerveless kind, who will look calm, unmoved, even if you do happen to ram a nerve-bristle into a live pulp. Of course we do not mean the fellow who goes to sleep and slides down in the chair out of reach. Such are worse than the other kind who ask if you are not most through using that buzzer, when you haven't got even a good start. The most exasperating of all is the woman who snatches at your wrists and "can't stand this a minute longer," who when finally you tip her out of the chair, volunteers the statement that you "didn't hurt her the least bit, only she was afraid you were going to, presently." And laughs. (Somebody page Billy Sunday and ask him to announce publicly just what such women are going to have happen to them, some day. Any dentist practicing in Poughkeepsie, Kalamazoo, Denver, knows the creature. Such patients make the dentist wish he had chosen funeral directing, anything soothing, instead of dentistry.)

Some one occasionally asks the dentist: "How did you ever come to choose so horrid a profession?" much as you might ask your meat-man how he ever happened to choose butchering, if you were not restrained by delicacy. A lady seating herself in your chair sighs desolately, "I wouldn't have my son learn dentistry, oh, not for worlds!" and shudders. When she opens her purse to pay you she sighs, "Gee, but ain't dentistry expensive?"

Does it ever occur to us dentists that this very repugnance to our calling is the dentist's capital? The mother who wouldn't have her son be a dentist, is perhaps holding back one who might prove to be a rival in your neighborhood. If it be true as some paper recently reported, that to serve the 110,000,000 of the population of the United States, there are only thirty-four thousand dentists, competition in dentistry would seem to be at a minimum. (This must be a mistake.)

So many dentists have never worked at anything else that they have only the vaguest ideas as to the nature of other men's occupations, each one's peculiar trials and exactions, and so imagine their own are the worst of any set of workers. If the individual dentist be one who just happened into dentistry, having no powerful drawing toward either its surgical or its mechanical aspect, but had his thoughts directed to other considerations such as the being one's own boss, the controlling of one's hours, and so on, he may become pronouncedly dissatisfied with the practice in a short time, especially if he get the impression that people of his community give him a somewhat low social rating. Ladies, he notices, bow somewhat more effusively to the lawyer of note, the banker, the popular preacher, than to himself. This hurts his pride, unless he fortunately esteems dentistry of far greater importance than conducting lawsuits, loaning money, preaching sermons. The really sensible dentist easily rises above all that, having too much self-respect to be easily influenced by what people, often his inferiors, may think of him. Numbers of a class of people who might take pleasure in snubbing him, are not half as worthwhile citizens as he is.

No matter how high a man's station in life, there always will be those who think themselves higher still, through pure arrogant assumption. It would be folly, however, to deny or to attempt to blind our eyes to the fact of social distinctions in the United States as elsewhere. These distinctions are mainly founded on wealth. People rise from humble stations to mingle with the wealthy, and are acceptable because their means enable them to take part and bear their share of the expenses of such pleasures as only plenty of means can purchase. If this were an essay on sociology, we might go on for half an hour or so, ladling out this sort of pabulum. Dentists come from a grade of society made up of those who must work for a living, it need hardly be said. Young men of fortune usually choose something less laborious. We might even admit that such, if they came to think at all of our profession as a calling, would dismiss it from consideration as somewhat menial in its offices. It was told of an American dentist practicing in London, years ago, that at a reception of dignitaries he was openly cut by numbers of his patrons of the nobility or gentry. But after the Prince of Wales (the late King Edward) had greeted him familiarly, and talked with him several minutes, the others came up and saluted him with effusion. Such is snobbery. Glad are we that this isn't England!

The men who might have become dentists but preferred something else, are found to be farmers, insurance agents, clerks, bookkeepers, salesmen, *et id genus omne.* (See Webster, back part.) (Or Cicero De Officiis.) Many of them would shudder, if you suggested dentistry to them. The dentist deploring in secret his ever having become a dentist, might profitably consider certain features governing the condition of these others. Most of them are subordinates. Some circumstances affecting their comfort, prospect of advancement, maintenance of self-respect, and so on, they may control; others are beyond their shaping or directing. They are under obligation to superiors who may be likable or the contrary, as it happens. Large numbers of them are of the salaried class, whose advancement depends not always on their making good, but it may be on their being in favor with a superior.

The young dentist, who, as a boy, has gone from school directly into the office of some dentist, afterward to the dental college, may have no conception whatever of the foregoing. He may come to envy a young man acquaintance who is on the road selling supplies, or establishing agencies for his firm or company; he learns that this friend is paid fifty dollars a week, and all expenses, and he thinks of his own fifty, seventy-five dollars a month (if he is fortunate enough to collect it all), and his burden of expenses ever accumulating. What he probably does not think of, because he knows nothing of it, is the anxiety the other may suffer lest he fail to "make good," be called in and told his results are not satisfactory, and have it hinted to him that if that is the best he can do he might—resign. He knows nothing of the early rising in all kinds of weather to catch trains, the long waits at dismal wayside stations for trains, the discourtesy of grumpy merchants, who all but tell him to clear out, and all that.

The young dentist has none of the humiliating, ofttimes galling sense of subordinacy, which clerks, bookkeepers, others in stores must frequently feel. Many a clerk behind a counter would esteem it a blessed privilege, when he is tired and feeling the need of refreshment, to go out and take a five- or ten-minute walk around the block. The dentist is seldom too busy to do that, if he wish. He may and often does take a half, a whole day off, if he feels the need of it. Furthermore he knows that all that is needed to advance himself, is mastery of his profession, a good address, a few other qualifications wholly within his grasp, wholly within his control. The clerk, the bookkeeper, may see just ahead a most desirable position he hopes some day to be called on to occupy. He may perhaps have been encouraged by the present incumbent to prepare himself for the place, he, the present incumbent, having privately in mind to take a higher position elsewhere. Accordingly the young aspirant devotes all his spare moments to preparing, cuts short his recreation hour, denies himself relaxation of evenings. This perhaps goes on for a year, until he feels himself reasonably well equipped for the position. Then, some day, a son of his employer comes home from college and with no preparation whatsoever, is installed in the place.

The dentist from the beginning of his career, is far more independent than the average salaried man. He takes orders from no one, not even from his patients, if he be made of the right kind of stuff. Of all the professions none offer a chance of quickly getting upon one's feet and making a comfortable living, equal to that offered by dentistry. Let us consider furthermore, various features favoring the present-day practice, a few years ago quite undreamed of.

There are the automobile and the telephone, bringing the dentist into close communication with far-distant patients *in posse*, immeasurably widening the scope of his influence and service. Let him but excel and people afar are sure to seek him out. The country dentist at this time, is quite as likely to be sought out as the city dentist, by people who care to know. The instance which I am about to cite refers to a man of not over thirty-five who practices in a central town of 1,200 inhabitants, a college town. Within a radius of sixty or seventy miles are towns and cities of from 10,000 to 40,000 people. Most of his patrons are from these various places. I have been told that he has managed to let these far-distant people know that he is really a good dentist, that many have tried him and have found his claim to be true, and have sent him others, until today he has all he can attend to, serving these out-of-town patrons.

He is said to discourage the over-"thrifty," who want full quotations in advance, claiming they can do as well or better in the city. (Wise fellow.) People who try to "beat you down," are usually of a sort who will take further advantage of you after you have made one concession. A man who comes in saying, "Do this work for me as cheap as you can, and I will pay you when I can" (actual quotation), will be one of the first to find fault on slight pretext, with your work, believe me.

The trouble with many young dentists is not that they take offense too easily, but that they do not quickly enough recognize the insolence and presumption of certain patients. The dentist who allows a patient to submit unrebuked, so extraordinary a proposition as the one quoted, is sure to suffer further from that patient's insolence. Repel such suggestions as soon as made. *It is absolutely not worth a dentist's while to work for patients who at the outset displease him.* This I regard as so important to be considered that I have half a mind to ask the printer to set it up again, in italics. (Agreeing, I've marked it "up," to be so set the *first* time—H.) Even though it may cost you something at present, it pays not to work for certain people who from the start impress you disagreeably. Chalk that down.

The dentist who knows how to manage, how to handle people, when to withhold himself from the presumptuous ones, is far more independent than any but the most favored of the salaried class. He has at least a privilege, if he feels indisposed, of cancelling engagements and taking a rest. He need make no special or exceptional plea, either; his simple word is sufficient. Whereas the clerk, the bookkeeper, must look really ill, or his employer, if none too good-naturedly trustful, may discredit his plea. Perhaps the dentist feels suddenly moved to go fishing. He need not proclaim from the housetop his contemplated delinquency; he simply tells his office-girl he is not today in the humor for work, directing her to draw on her repertoire of fairy tales for a plausible excuse, should anyone ask for him. A properly instructed office girl should be equal to such emergencies.

Lots of dentists lack a certain kind of faith that has no relation whatever to religion—faith to believe in the recuperative value of a dog and gun, a fishing tackle, tennis, golf, a day's ramble in the woods. The automobile is a valuable aid to the nerve-tried dentist if merely as introducing him to unaccustomed scenes and surroundings for a few hours. All this "knits up the raveled sleeve of care."

If the young dentist disappointed in practical office dentistry inclines to make a change, the chances are he should actually do so. I am saying that I have much faith in the young man of even eighteen or twenty, as to his judgments, at least if they be based on good common sense and not on mere fancy. I believe he ought ofttimes even to disregard the warning advice of friends, even of his own family, if such advice conflicts with his studied-out convictions. Even intimate friends do not always know; their advice is often based merely on general principles, worth far less than the young man's opinions based on actual knowledge. Polonius in suggestions to his nephew about to go forth in the world, says: "Give every man thine ear, but few thy voice; take each man's censure (advice) but reserve thy judgment."

I say to the disappointed young dentist, quit and try something else, if you have found the something you prefer. The young dentist need not burn his bridges behind him, at that; let him store his dental outfit in readiness for a resumption of practice, should he find himself repossessed in favor of the discarded profession. If, however, he persist in practicing, after having discovered his actual unfitness for the profession, let him consider that he must always be content to take a lower rank than the other fellow, perhaps a former classmate, who easily grasps mechanical suggestions which are for him difficult, who would rather practice than eat. The enthusiasm of such men carries them over the matter of inconveniencing and torturing a patient; they simply ignore all that, are not themselves reacted upon by it. They like dentistry better than the average patient likes them, doubtless.

Changes which promise to be of advantage to the dentist are likely to come with the progress of years. A dentist who practiced several years abroad, an American, told me that European dentists of the highest rank often do not show even a sign on their office fronts, the office being in the home. They invite only the wealthy as patients. Now that dentistry is more and more dividing up into specialties, it may come about that the local (American) dentist, who has no wish longer to engage in general practice, may adopt a similar plan for his future practice. Platework is becoming a specialty, likely to rank in exclusiveness with orthodontia, exodontia.

The older practitioner weary of going into partnership with patients' woes, may send expressly-worded cards inviting patients to call at such and such a number—to be carefully remembered—the office sign being to him a something obsolete. All of which means refuge from the more trying features of practice—the patient who hates your highly-esteemed buzzer; the dear little boys and girls who best like a dentist at long range; the deserving poor, who are too proud to go to the dental college, but not too proud to ask of you your best service at reduced rates. The wondering neighbors, seeing so many unknowns mysteriously resorting to you, may, if you prefer, be left to imagine that your wife or sister has learned card-sharping, and is privately giving lessons in the art of always winning at bridge.

Seriously, there must be important advantages in this mode of practice, or the American dentist abroad would not use it. The exclusiveness of the mode must commend itself to many who object to mingling with the mass of the dentist's patrons. To the dentist who wishes, after the wearying years of a general practice, relief in greater leisure, it may be, this offers inducements. He may give up his office, announce his retirement, take a long vacation, then perhaps remove to some distance, even to another city or town, and resume on the new basis. I believe this is practicable.

The writer, in his first experience of going among total strangers to open an office, having no introduction whatever, found no difficulty from the first day, in getting patients. This was in an Illinois village of only 1400. It is nothing, nothing at all of a venture for one really qualified, which the writer was not. Nevertheless he got on all right, with little effort.

Let one of the bolder spirits try the European scheme of practice and report on it.

22 The Parkside, Clifton.

SYNERGISTIC ANESTHESIA FOR DENTAL SURGERY*

BY M. ECKER, D.D.S., NEW YORK CITY

WHEN anesthetics were first used, the comparison lay between hypnotism, their immediate predecessor, and ether, with the result that hypnotism was quickly relegated to oblivion. With the introduction of ether, nausea and vomiting were accepted as a matter of course. In capital operations the after-effects are of little moment in comparison with the magnitude of the operation. In a dental office, however, the by-effects cannot be overlooked; and as the extraction of a tooth is not a capital operation, the sickness and disgusting after-effects of ether should not be tolerated. It was therefore by a natural evolution that in dental surgery the first refinement in anesthesia should take place. This was the elimination of nausea and vomiting by the use of nitrous oxid instead of ether. For many years this gas was used alone, and even today with many dentists the cardinal sign of anesthesia is cyanosis.

ASPHYXIAL AND NON-ASPHYXIAL ANESTHESIA

Cyanosis and asphyxia are almost synonymous terms. In the early days *anesthesia* meant *asphyxiating the patient*, removing the mask, and quickly completing the operation. If the tooth was broken or if the operation was incomplete, the mask was reapplied, the patient again asphyxiated, and the extraction completed. With nitrous oxid, asphyxiation is comparatively safe, for this reason: The antidote is air; when the mask is removed for the extraction, the next breath supplies the patient with air and he quickly returns to normal. Once in so many times respiration does not immediately return; then the dental chair must be quickly lowered, a slap on the chest given, and artificial respiration commenced immediately. This is usually successful, but deaths have occurred, and to the operator the knowledge of this possibility is ever present.

With the introduction of oxygen the asphyxial factor was eliminated, and by this combination a deeper and a safer anesthesia is secured than with nitrous oxid alone. With certain patients, however—the athletic and the alcoholic—the anesthetic must be pushed, and while the patient's color is partly retained by the oxygen, certain other signs of asphyxia or anoxemia may be present—such as twitching of the muscles and jactitation. Even with this infringement upon the danger zone the anesthesia is not entirely satisfactory.

THE EVOLUTION OF PERFECTED DENTAL ANESTHESIA

Accordingly, with the idea of obtaining a safer, deeper, and more satisfactory anesthesia than heretofore possible, a new and different technic was sought and finally evolved. We can now quickly obtain an even, deep anesthesia in all cases, while at the same time keeping the patient's color pink and normal, and averting all jactitation and anoxemia. Not only is the work more satisfactory from the patient's standpoint, but the dentist emerges from a hard day's work in a quiet, normal condition, secure in the knowledge that not a single patient has been placed in the danger zone. Safety must be the first consideration. The pink color, normal pulse and respiration, and the quiescent state of the muscles all prove beyond question that the danger zone is not approached with the new technic, while the narcotic effects of the nitrous oxid are maintained and the anesthesia can be continued indefinitely.

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*Read during the Sixth Annual Meeting of the Interstate Association of Anesthetists in Joint Session with the National Anesthesia Research Society and the Odontological Society of Western Pennsylvania, William Penn Hotel, Pittsburgh, October 5-7, 1920.

At one time an attempt was made to minimize nausea and vomiting by employing chloroform instead of ether, but as the toxicity and pathological effects of this drug became apparent the use of ether was resumed and it is today the anesthetic of choice in the vast majority of surgical operations.

Then morphin alone was tried in surgery, but with this method the analgesia and danger zones were found to lie too close together and it was abandoned, though morphin is now almost universally employed as a preliminary and postoperative adjunct to chloroform, ether and nitrous oxid and oxygen. It is also used with local, spinal, and regional anesthesia. Such combinations, mixtures, and sequences of anesthetic agents have proved to be safer and more satisfactory in surgery than any one agent alone.

NECESSITY OF SYNERGISTS IN DENTAL ANESTHESIA

For routine dental work, these synergisms are not practicable. While nitrous oxid-oxygen *alone* is applicable for 50 per cent of dental cases, there remain 50 per cent in which it is not satisfactory. The brain is not completely blocked from the field of operation. Many operators strap the hands and body of all patients, thus acknowledging the possibility of an irregular and unsatisfactory narcosis at any time.

With gases alone, an uneven narcosis—such as movement during extraction—prevents the dentists from doing his best work, and for this reason they are unsatisfactory—although the patient may remember neither pain nor movement after recovering from the anesthetic. In fairness to the patient, the old technic should be improved.

A hypodermic of morphin is impractical except for hospital cases; nor can we use ether-chloroform and ethyl chlorid as they are generally employed in hospital clinics, but by adapting certain fundamental principles that have been tested and found satisfactory in surgery we have secured a safer, more even and satisfactory anesthesia than any heretofore employed in dentistry. *Safer*, because the patient is *pink* from start to finish and never cyanosed at any time, with pulse and respiration always normal; *even*, because no holding straps required for any patient; *satisfactory*, because the dental work can be completed without haste.

The method to be described was evolved after using nitrous oxid-oxygen alone in over 55,000 cases. To date, I have used the new method in over 5,000 cases. The abdominal belt and arm straps for the unusual case have been discarded. The nausea and vomiting are about the same as with nitrous oxid alone or combined with oxygen.

The surgical and dental problems are fundamentally the same. The brain block is incomplete and unsatisfactory with nitrous oxid-oxygen *alone*. In surgical practice they are supplemented with morphin-ether and local anesthesia. Our final technic now being followed in all cases was evolved as follows:

Nitrous oxid and oxygen in sufficient quantity to produce unconsciousness was passed over the surface of the agent used, relying upon this addition to complete the brain block. Cotton-process ether was tried first. The anesthesia obtained in this way was perfect but the after-effects compelled a halt. Then anesthol (composed of 17 per cent. ethyl chlorid, 35.89 per cent. of chloroform and 47.10 per cent. of ether) was tested. This anesthesia was quite as satisfactory as that with ether, and with only six cases of nausea in sixty-two patients. The return to normal was more rapid than with ether alone.

Paraldehyde was tested in 130 cases. There was very little change in the anesthetic over gas-oxygen *alone*. There was no nausea, vomiting, nor headache, and the posthysterical cases were eliminated.

A mixture of ethyl chlorid in oil was next used, and although as much as two drams of ethyl chlorid per patient was used not enough change in the anesthesia was noted to continue its employment.

A solution of paraldehyde and anesthol, 50 per cent. each, was next tried with results so satisfactory that we have retained this combination as our final technic. Ten drops of anesthol is the average amount used with each patient, and while the bouquet of the paraldehyde is slightly distinguishable at the patient's face, the amount used in each case is negligible.

COMPARISON OF RESULTS

In a freshly prepared mixture of anesthol and paraldehyde, if the exposure is the same in each case, the evaporation is greater for the first five cases—about 40 minims of anesthol each; after this time, only 12 to 15 minims for each case. The exposure is so regulated that each patient gets about 30 minims of anesthol.

The comparison between the 55,000 straight nitrous oxid-oxygen and the 5,000 synergistically given anesthetics—as made by my associates, assistants, and others that are in position to compare the two methods—is so obviously in favor of the latter that a return to former methods is simply preposterous. Our minds are still open in the matter and if laboratory tests offer later a simpler and better method we will unhesitatingly adopt it; but we will continue the present technic until some safer and better method is presented.

SUMMARY

To summarize: With Synergistic anesthesia—

1. The induction period averages one minute and a half, using nitrous oxid-oxygen *alone* for the first fifteen seconds; after this, anesthol and paraldehyde until completion of operation. The induction is smooth and holding straps are unnecessary.

2. The oxygen is used from the beginning of anesthesia. The patient is pink from start to finish.

3. A safer and deeper anesthesia is maintained throughout than with the old method and jactitation is almost absent. There is no movement nor flinching during operation.

4. Recovery is smoother, with less hysteria. Patients can walk unassisted from chair to waiting room.

5. The incidence of nausea and vomiting is the same as with nitrous oxid-oxygen, *i. e.*, as far as the patient is concerned he is unaware of getting anything but gas-oxygen.

6. With the face mask method the operating period averages one to two minutes in comparison with thirty seconds with the gases alone With the nasal inhaler, it can, of course, be continued indefinitely.

7. Finally, as a sequence to the increased safety, ease, and comfort of operating upon an unflinching patient, the phyical and nervous strain upon the operator under the old system is entsely removed, and this conservation of energy is a factor that should not be ignored.

147 Fourth Avenue.

A BUST OF MORTON FOR THE HALL OF FAME—SEND YOUR CONTRIBUTION NOW

In the election of Dr. Wm. T. G. Morton to the Hall of Fame the allied professions of medicine and dentistry have been singularly honored. By their overwhelming vote the Electors have also evidenced the appreciation of the public at large for the beneficence of anesthesia.

Recently, at the Annual Dinner of the American Anesthetists in Boston, during A. M. A. Week, Dr. S. Adolphus Knopf, a leading advocate for the honoring of Morton, said it would be a proud privilege for the Associated Anesthetists to place a bronze bust of Morton in the niche assigned him by the Electors. This is to be done on October 16, in celebration of the Diamond Jubilee Anniversary of Morton's First Public Demonstration of Ether Anesthesia.

The Associated Anesthetists, as well as other prominent leaders of the allied professions, are, therefore, urging all those interested to make a substantial contribution for this purpose.

Kindly send your check or money order at once to

Yours appreciatively,
F. H. McMechan, M. D., Sec'y-Treas.
Associated Anesthetists,
Lake Shore Road, Avon Lake, Ohio.

PARTIAL DENTURES

BY I. J. DRESCH, TOLEDO, OHIO

(Written for THE DENTAL SUMMARY)

PROBABLY, IN ALL PROSTHETIC DENTISTRY there is nothing so generally disliked as partial denture work, and in the same breath we may add, so generally unknown and misunderstood. And yet, when partial work is placed on a scientific basis, the proper technic accurately carried out, partial dentures are no more difficult than full dentures, and quite as satisfactory.

The general attitude toward partial work can be attributed to general misinformation and lack of knowledge of the subject. The average dentist looks upon a partial denture as a make-shift—something that will do until the remaining natural teeth are lost, when a full denture will be made. In making a partial for his patient, it is the usual thing to think of it as a gob of rubber with teeth attached, or when gold is used as a piece of jewelry. Little thought is given in regard to the service that the restoration will give; it is just a prosthetic appliance made for a fee.

So first of all, we need very badly, to get a new and more professional viewpoint of the partial denture. If the partial we make does not do the work of the teeth it replaces, even in part, we might just as well take the patient's money, cut a hole in the wall, and then place the denture therein. On the other hand, if the denture we make will restore lost masticating efficiency, if it will protect the remaining natural teeth from over-functioning, then indeed we will have accomplished something. We will not only restore occlusion, mastication, better assimilation of food, but most important of all, we will save the remaining natural teeth from loss through excessive and unnatural use. A restoration that does these things is worthy of our serious attention, especially when we stop to consider that the average partial denture does not restore occlusion, but in fact usually causes the loss of the abutment teeth.

So then let us think of a partial denture, not as a gob of rubber, or bright shining gold, but rather as a restoration that through the occlusion it affords will protect the remaining natural teeth from loss, and will tend to promote a general betterment of the patient's health because of increased mastication and better assimilation. When we get that viewpoint, when such a restoration is our goal, the vulcanite or gold we use are but details, mere agencies in our hands. Then we begin to give the patient service, professional service at professional fees, and not something that can be carried away in the pocket, and which brings a mechanic's or retailer's "price."

A partial denture that restores occlusion, automatically relieves the remaining teeth from over-functioning. The problem then is to restore occlusion. To do that we must do more than just set the teeth to come into contact; we must place a denture in the mouth on which the patient will chew. When you run a bur in your index finger and it gets sore, you continue to possess the finger, but you don't use it. When a denture is worn but not used for masticating purposes, it is merely filling a void and is as useful as a Ritter Unit in a blacksmith shop.

The requirements for a partial that will be used for masticating purposes are few: first, occlusion; second, tight fit; third, comfort. When these three requirements are combined in a partial denture, the patient will obtain the full benefit of modern dentistry. But if any of these requirements are missing, the effect would be the same as if all of them were missing.

Let us examine the requirements. Occlusion, of course, is the first essential, because without occlusion we would not have anything. Suppose then we had occlusion, but the denture was not tight, what would be the effect? Imagine yourself using a partial denture, that when you bite on one side, moves up on the other; when you close on the anterior, it is pushed backward; when you close on the posterior, it is fairly lifted away in front. You might wear such a case, keep it in your mouth, but you would not chew on it. *You would use the remaining natural teeth for mastication*, especially for such effort as is required in cutting fibrous foods, such as meats. When such loose cases are posterior restorations, the anterior teeth soon become in a pathological condition,—then the forceps and a full denture, because nature never intended the anteriors to be used as masticating units. But presuming the denture has occlusion and is tight, but that it is not comfortable, the result is the same. In many cases the denture will be comfortable while the jaws are at rest, but they are not comfortable when the jaws are working.

The chief trouble has been that when we made partial dentures tight fitting, we had to sacrifice comfort. The discomfort is usually caused by the tight fitting retaining agent, which places the masticating stress upon the abutment teeth. Then again it is caused by the same agents which tend to grip the abutment teeth in a vise-like lock, and cause binding and an uncomfortable tight feeling. In fact when we obtain a rigid connection between the abutment teeth and the restoration, we also have immediate discomfort, because our appliance has the same effect as a class three lever on the abutment tooth.

To thoroughly understand the problem, we must ever keep in mind the fact that the mucosa underlying the denture is displaceable. That when the jaws close on the restoration during mastication, the mucosa is displaced about one millimeter, in the average case. That when this displacement takes place, the denture becomes a third-class lever, prying on the abutment tooth if there is a rigid connection between the two. At the same time we must also bear in mind, that if we do not use a rigid retainer, but use a light band or wire clasp that can move in harmony with the denture, we have trouble from another source.

When the mucosa is displaced the denture becomes a third-class lever, if the denture is rigidly connected to the abutment tooth. A denture one inch long will have a mechanical advantage of nine or ten. If ten pounds pressure is placed at one end the mechanical advantage of the lever will transform this pressure to from ninety to a hundred pounds at the other end. This pressure would not be very destructive if it were placed on the tooth in line with the long axis of the root. But the denture which acts as a third-class lever places this leverage on the tooth at an angle. The pressure or leverage tends to force the tooth from the socket on about the same angle that the forceps act. This movement or stress literally crushes the delicate peridental membrane which is caught between the cementum of the root and the walls of the alveolar process. For as the tooth is pulled to one side, there is no escape for the membrane. That is the reason abutment teeth become sore and sensitive, sometimes actually painful, and without showing any inflammation at the gum margin. When light clasps move in harmony with the denture, the trouble is caused by friction, for where there is friction there is wear, and when the enamel becomes sufficiently worn each movement of the clasp becomes painful; and when that happens the denture ceases to function as a masticating unit—it may be worn, but it is not used.

Another phase of high importance is the resorption that may occur. When resorption occurs occlusion is lost. In the construction of gold cases this should be remembered, and when possible, provision made to allow for re-basing. A restoration can be made that will help to promote a normal condition of bone and tissue life, and by the same token, a denture can cause the excessive resorption of tissue and bone.

This question is one that few men agree upon; what one dentist says will cause resorption, another will say maintains normal conditions. Some men will prove that pressure causes resorption, others will prove that pressure promotes a normal condition. They are both right, and the apparent difference in their opinions is explained by the different types of pressure that they have in mind. For instance, a continuous pressure that stops the flow of either venous or arterial blood will cause resorption, but a pressure that has a pounding effect, one that is not continuous, will have a stimulating effect and promote normal blood flow. When the blood flow can be maintained in a normal degree, there will be very little resorption. Resorption will always be in harmony with the diminishing of the blood flow.

It follows then when the teeth are extracted and the jaws are not called upon to do much work, the diminished blood flow results in the consequent resorption. But if a comfortable denture is then placed in the mouth, one that the patient will chew on, the pounding effect will stimulate the blood flow and resorption will be checked. In fact if it were possible to use the denture enough to maintain a normal flow of blood, there would be no resorption at all.

A correct understanding of the two kinds of pressure that a denture can exert is especially needed by dentists who use what is known as "the biting stress relation." A number of years ago Prof. Peeso, of Philadelphia, first introduced a system of bridge-work that placed sufficient pressure upon the jaw to promote blood flow, and thus minimize resorption. His system was based upon the use of retaining agents that could move toward the jaw during the displacement of mucosa. In that manner the masticating pressure was carried directly to the jaw underlying the bridge. While the jaws were at rest the bridge lightly rested upon tissue, but when mastication commenced the pressure was placed directly on the jaw, because the retaining agents allowed of a movement in harmony with the displacement of tissue. To determine the correct relationship of the various parts, Dr. Peeso took what was termed a "biting stress relation." That is, the relation of the saddle to the retaining agents, was obtained under biting stress with the mucosa displaced. But when the bridge was placed in the mouth the saddle did not displace tissue except during mastication.

Since the advent of the cast clasp, a great many men use the Peeso biting stress relation to overcome the displacement of mucosa. But they do not have movable retaining agents such as Dr. Peeso used, but a fixed cast clasp, and of course an altogether different effect. When the biting stress relation is used with fixed cast clasps, the mucosa is continually displaced because there is no opportunity for a release, the clasps being fixed. This continual pressure stops the flow of venous blood, which re-acting on the arterial flow soon causes resorption. And until the resorption takes place the denture is uncomfortable because the abutment tooth is continually called upon to supply the force which keeps the mucosa continually displaced. In other words, in order to remove stress during mastication, we have a continual stress all the time the jaws are at rest.

This same effect is seen when compound impressions are used in connection with cast-clasp dentures, or partials with any type of fixed retaining agents. It is absolutely impossible to take a compound impression without displacing tissue. In scientific impression taking for full dentures modelling compound is used because tissue can be displaced with it. When the compound is confined in a tray, and sufficient pressure used to take the impression, some of the tissue is always displaced. But when a biting block is used in taking the impression, the maximum displacement of mucosa takes place.

When the impression is for a full denture the biting-block displacement effect is only noticed during mastication. At all other times the denture is just resting against the tissue to the extent that atmospheric pressure holds it there. But when a biting stress compound impression is used for a partial case with fixed attachments we have an altogether different effect. When the biting block impression is taken, the mucosa is displaced, but the abutment teeth remain stationary, and of course the position of the retaining agent as well. So then the finished denture when it is placed in the mouth will continually displace as much mucosa as was displaced when the impression was taken. As the abutment teeth do not move, and as the fixed attachments do not move, the relation of the attachments to the tissue will be just the same when the denture is in position as when the impression was taken. So if mucosa is displaced during the taking of the impression it will surely be continually displaced when the denture is in position. This of course is another cause of sore abutments, uncomfortable restorations and resorption.

To sum up then, the ideal partial denture will first of all have occlusion. It will be held in place by retaining agents that will properly retain it, without placing undue stress on the abutment teeth. The retaining agents will allow the denture to move with the displacement of mucosa so as to have a pounding effect on the tissues, and promote blood flow. The retaining agents will not cause binding or uncomfortable tight feeling. And last of all, the impression upon which the denture is built, must be of plaster, so that the mucosa will not be displaced. With these conditions carried out, partial dentures will restore occlusion, will be tight and will be comfortable. Furthermore, such a denture will have a good chance of remaining tight through the minimizing of resorption, and by the same means will remain in occlusion and be comfortable.

Pyorrhea specialists are frank to admit that a great deal of pyorrhea is caused by the lack of occlusion, where dentures are worn but not used, resulting in over-functioning of other teeth. In some instances dentures badly needed are not worn at all, because the dentist had no hope of making a satisfactory restoration. It is to be hoped that with a broader knowledge of the subject, partial denture work will soon be on a par with other branches of prosthetic dentistry.

FUNDAMENTALS OF OPERATIVE DENTISTRY

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TECHNIC OF OPENING AND FILLING PULP CHAMBERS AND CANALS

IN THE PERFORMANCE of the various technical procedures incident to opening and removing the contents of the pulp chamber and canals to be described in this chapter, one of the following conditions will be present:

First, the pulp previously has been anesthetized with novocain hydrochlorid, or

Second, it has been devitalized with arsenic trioxid, or

Third, the organ is nonvital and uninfected, viz., in a state of dry gangrene, or

Fourth, it is infected and putrescent.

There is no operation in the entire field of dentistry or surgery, which requires greater skill than that of the proper opening and filling of root canals. There is none which has a more far-reaching influence on the future health and well-being of the patient. The non-removal of pulp remnants, the imperfect opening, enlarging and sterilization of the canal to the apex, or the failure to hermetically seal it for its entire length, results in the leaving of an inviting field for the continuance or establishment of a septic condition, which may later undermine the health and produce even death of the patient, through the absorption of toxic products into the system, by way of the lymphatics and blood streams in the tissues of the apical space. (*Figs. 238, 239, 240, 241, 242 and 243*). A full discussion of this phase of the subject is deferred until a subsequent

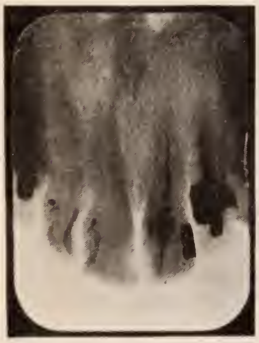


Fig. 238

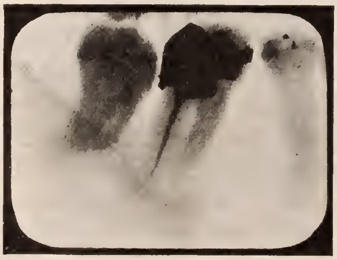


Fig. 239

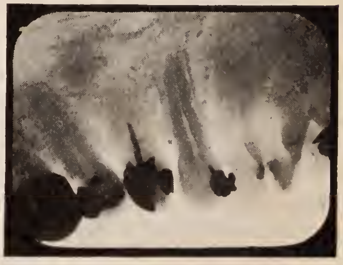


Fig. 240

Fig. 238—Imperfectly opened and filled canals in the upper left central and lateral incisors.
Fig. 239—Canals not opened and filled in the mesial roots of the lower molar.
Fig. 240—Canal imperfectly opened and filled in a bicuspid.

chapter. However, it is deemed wise to mention it here, in order that the importance of a thorough realization of the bearing of the operation on general health conditions may be at once clearly perceived.

Pulpless teeth with anomalous roots impossible to properly treat and fill, should be extracted without hesitation. (*Figs. 244 and 245*). Teeth affected with incurable pathologic disturbances in the canals or apical space should be unhesitatingly removed. The possibility of the existence of an excessive number of roots, as well as concealed root canals, should be borne in mind constantly, and redoubled care exercised in an attempt to discover an opening. It should be remembered also that the majority of roots exhibit more than one apical foramen, oftentimes many minute accessory canals in the apical third, or even in the mid-root, being present. These are, in the present state of development of our technical skill, impossible to fill. However, a realization of these anatomical conditions should redouble the painstaking care exercised in canal sterilizing and filling procedures.

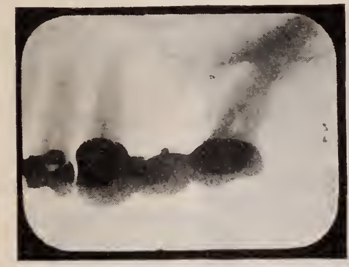


Fig. 241

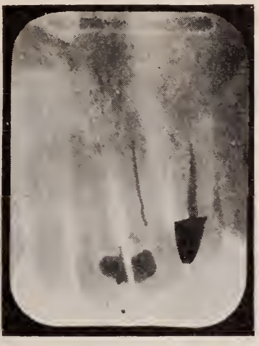


Fig. 242

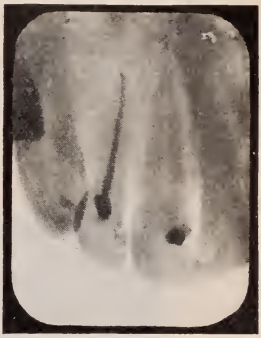


Fig. 243

Fig. 241—Poor canal operation in the second bicuspid.
Fig. 242—Imperfect canal operations in the upper left central and lateral incisors.
Fig. 243—A good canal filling taken immediately after completion of the operation.

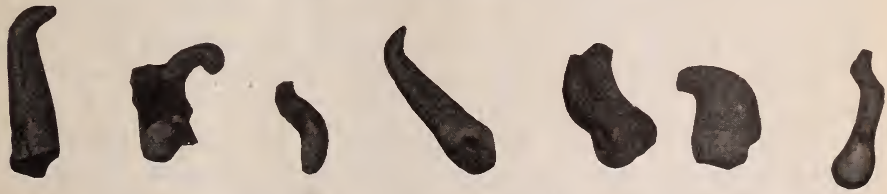


Fig. 244—Teeth with crooked roots (flexion) which would be very difficult to open and fill.

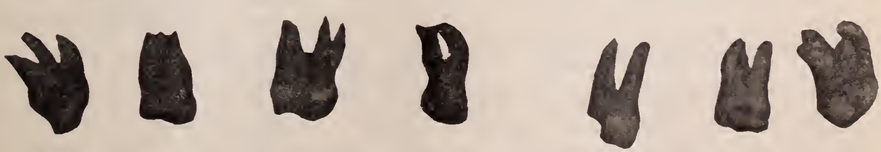


Fig. 245—Teeth with multiple roots.

Owing to the conditions under which the dentist is constantly working, a perfect aseptic root-canal technic is almost an impossibility. However, every effort should be made to accomplish as near ideal conditions in this respect as possible. The dentist is no more justified in introducing infection by way of the root canal than is the surgeon in doing so by way of the integument.

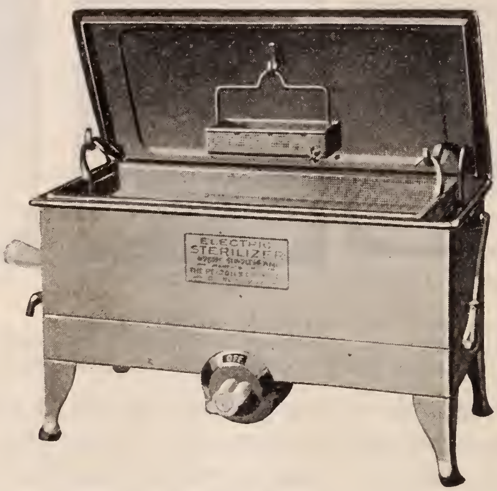


Fig. 246—Steam sterilizer.

The following technic for establishing and maintaining asepsis during root-canal work may be followed with assurances of excellent results:

First, seal into the cavity for two or three days a ten per cent. solution of beechwood creosote, as suggested by Grieves, thus sterilizing the coronal dentin; or in cases of putrescence, formocresol may be used.

Second, at the next sitting, apply the rubber cloth and sterilize the teeth included in the dam with tincture of iodin followed by alcohol.

Third, now open into the pulp chamber and canals, following the technic to be described, having the hands, all instruments, cotton, paper and root-canal points sterilized before proceeding.

Cotton dressing, absorbent points and napkins, should be sterilized in an autoclave or the Pentz sterilizer. The larger instruments should be boiled for twenty minutes. (*Fig. 246*). Broaches and other small root-canal instruments may be stuck into the under side of the cork of a bottle of convenient size carrying alcohol. Long-handled broaches may be set in bottles containing alcohol ready for use. The finger tips should be immersed frequently in alcohol throughout the operation. Rubber gloves may be worn, though they have a tendency to dull the delicate sense of touch required in these operations. For sterilizing broaches, absorbent points, gutta-percha points, and similar small articles, the Flaherty molten metal sterilizer is also a convenient and valuable adjunct.

The introduction of the X-ray has resulted in great improvement in the methods of diagnosis and treatment of these conditions. All roots which are to be treated and filled should be subjected to the Roentgen-ray at the beginning, and at frequent intervals during the progress of the various procedures, as well as at the completion of the root-filling operation, in order that the progress of the work may be revealed and the final results shown.

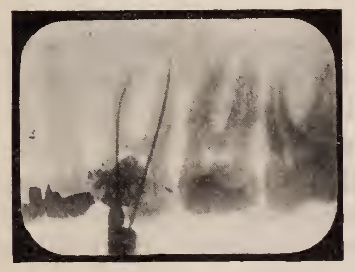


Fig. 247

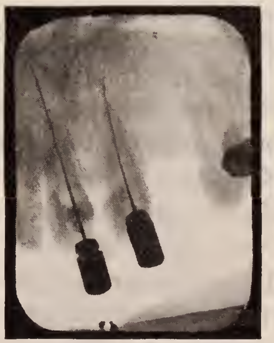


Fig. 248

Fig. 247—Diagnostic wires in position.
Fig. 248—Diagnostic wires carried in too far.

After exploration, opening and enlarging of the canals, diagnostic wires should be inserted to the end of each root canal (*Figs. 247 and 248*), and an X-ray taken, to make sure that the results desired have been obtained. If the radiograph indicates that the canals have not been opened to their extremities, additional work is then required to accomplish the result, at the termination of which the diagnostic wires are again applied and the tooth subjected to the X-ray a second time, to note the result. As diagnostic wires, old smooth broaches may be cut to convenient length and used, or strands of small braided picture wire may be substituted.

The following rules should be borne in mind constantly during the performance of the technical procedures:

Rule 1. When a cavity is present, make the approach to the pulp chamber through the cavity.

Rule 2. In sound teeth, or teeth with perfect fillings, enter through the center of the lingual surface of incisors and cuspids, the mesial pit of bicuspids, and the central fossæ of molars.

Rule 3. Enlarge the opening, whether through an already existing cavity or one artificially made, until convenient and thorough access to the pulp chamber and canals is obtained; at the same time, avoid mechanically weakening the tooth by too much cutting. *Fig. 248a* illustrates an improper and insufficient opening or approach for root-canal work.

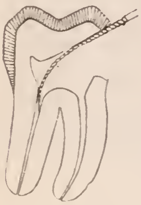


Fig. 248a—Improper and insufficient approach for accomplishing good root-canal work.

Rule 4. Make the walls of the cavity and pulp chamber continuous and smooth, though not necessarily parallel or on the same plane.

Rule 5. Make the walls of the pulp chamber and canals continuous and smooth.

TECHNICAL PROCEDURES FOR OPENING PULP CHAMBERS

The *Technic* for opening into pulp chambers in sound teeth is as follows:

A *Perforate the enamel* with a one millimeter bi-bevelled dentate fissure bur (made by bevelling a dentate fissure bur on two sides), or a small spear-point drill, in the handpiece of the engine.

B *Enlarge the opening* with a larger size bur or drill.

C *Perforate the dentin* gradually to the pulp chamber, alternating first with the smaller, and then with the larger size burs or drills, avoiding the danger of breakage by frequently withdrawing, and continuing in this manner until the pulp chamber is reached.

D *Enlarge the opening* with the same instruments until convenient access is obtained, and then remove the entire wall of the pulp chamber, extending the cuttings out until the horns of the pulp chamber are included.

E *Make the walls* of the cavity and pulp chamber continuous and smooth, but avoid cutting on the floor of the pulp chamber and obscuring the canal entrances.

F *Remove the contents* of the pulp chamber and all debris.

The *Technic* for opening through cavities of decay is herewith given:

A *Establish the outline form*, remove all decay, and make the cavity slightly retentive.

B *If the pulp is not exposed*, penetrate the dentin to the pulp chamber, with the drills previously mentioned, or the bi-bevelled dentate fissure bur.

C *Remove the wall* of the pulp chamber with a hoe excavator or a dentate fissure bur, extending the cuttings until the horns are fully included and the chamber is clearly exposed to view.

D *In incisors and cuspids*, straighten the approach to the canal by extending the cavity in the lingual or gingival direction, depending on whether the entrance is being made from the lingual or proximal surface, with a dentate fissure bur.

E *In upper molars*, straighten the approach to the mesio-buccal canal by extending the cavity with a fissure bur or cleoid excavator toward the mesio-buccal cusp, and enlarging the pulp chamber in the same direction by means of the same instrument, or a cleoid excavator.

F *Make the walls* of the cavity and pulp chamber continuous and smooth, but do not use a bur on the floor of the chamber.

G Remove all debris.

The following brief review of some important considerations with reference to the *Internal Anatomy* of the various teeth in their bearing on the technic of opening pulp chambers and canals is offered: The anterior teeth, both upper and lower, usually have one root canal, which is continuous with the pulp chamber, and as a rule easily found after the approach has been straightened, as already described. The upper first bicuspids have, in the majority of instances, two canals, one buccal and one lingual, although in probably one-third of the cases, only one canal is present. The upper second and the lower bicuspids present, as a rule, a single canal. In the upper molars there usually are present three canals, a mesio-buccal, disto-buccal, and a lingual, their entrances forming a triangle (molar triangle) (*Fig. 249*), while in the lower molars there are, as a rule, a mesio-buccal and a mesio-lingual canal, located in the mesial root, and a distal canal situated in the distal root. The possibility, however, of the existence of additional canals in molars as well as in other teeth always should be borne in mind. The canals in the lower bicuspids are more or less continuous with the pulp chambers, while those in the upper bicuspids and the upper and lower molars are separate and distinct from the chamber, opening from its floor with more or less constricted orifices. Owing to the presence of these constrictions, and the small size of the buccal canals in the upper molars and the mesial canals in the lowers, difficulty frequently is experienced in locating their entrances and following them with instruments to their termination.

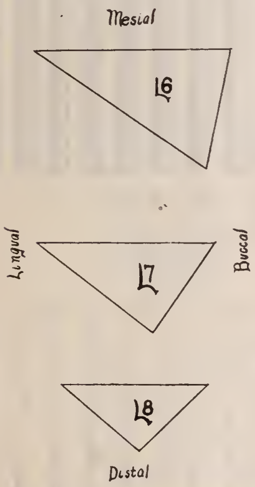


Fig. 249—The molar triangle, showing the location of the canal entrances in typical cases.

TECHNICAL PROCEDURES FOR OPENING CANALS

531. Describe the *Technic* for opening and removing the contents of the canals.

A *Locate the entrance* and explore the canals as far as possible with a small, round, smooth broach or canal explorer. (*Fig. 250*).

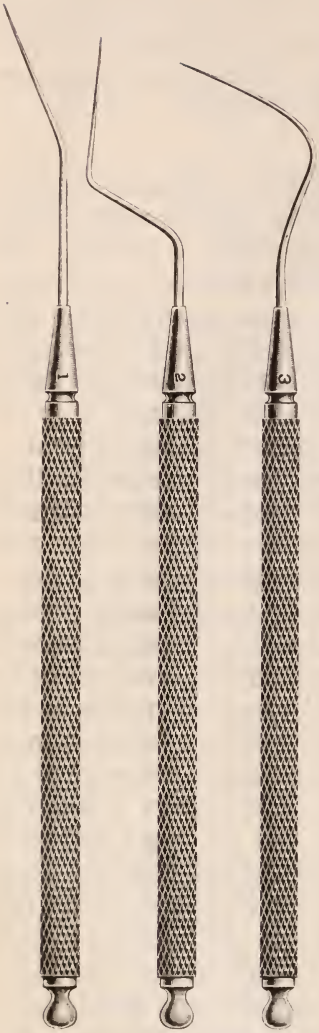
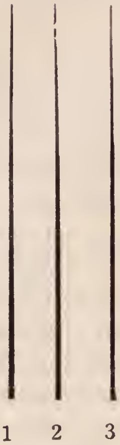
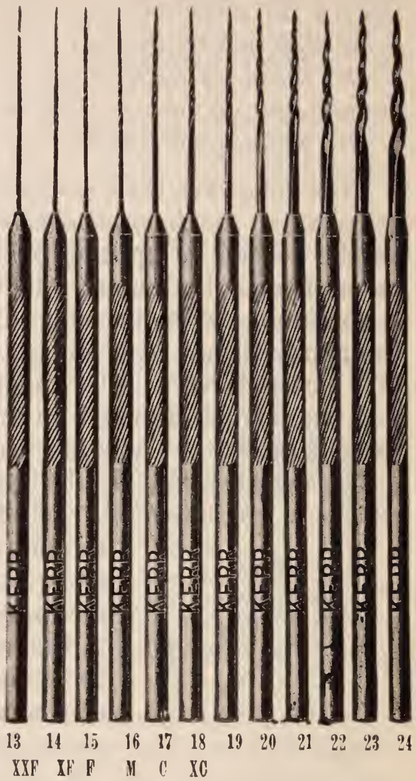


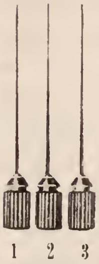
Fig. 251—Rhein root picks.



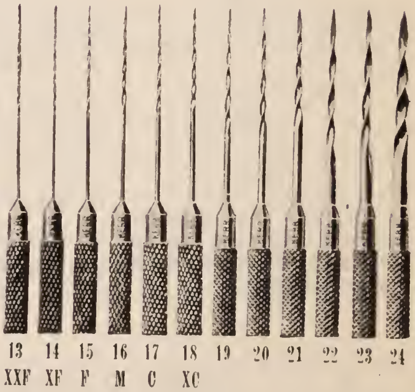
Style A
Fig. 252



Style **D**
Fig. 254



Style B
Fig. 253



Style C
Fig. 255

Fig. 252—Kerr root canal probes.
Fig. 253—Kerr root canal probes.
Fig. 254—Kerr tapered canal reamers.
Fig. 255—Kerr tapered canal reamers.
Fig. 256—Canal cleansers.
Fig. 257—Enlarged view of a canal cleanser.

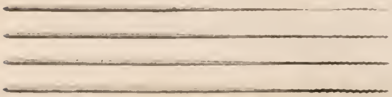


Fig. 256

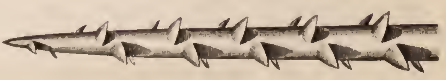


Fig. 257

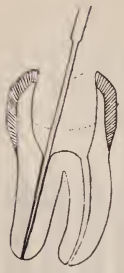


Fig. 250—Exploring the canal.

The Rhein root pick (*Fig. 251*), the Twentieth Century pathfinder and the Kerr root probe (*Figs. 252 and 253*), are all valuable instruments for this purpose.

B Enlarge the orifice of the canals with a Kerr or Downie tapered canal reamer (*Figs. 254 and 255*), or a Donaldson canal cleanser (*Figs. 256 and 257*).

C Make the walls of the pulp chamber and canals continuous.

D Pass a small canal cleaner to the apex, or until it binds, withdraw slightly, give it a half turn and then remove from the canal, bringing away as much of the pulp tissue as possible. Continue thus, using larger and larger sizes, as the canal will permit, broaching or filing the sides of the canals, and gradually enlarging them. Carry the broach just to the apex, and no further, unless apical complications exist and it is desired to enlarge the apical foramen. The passage of the broach through the apical foramen will produce irritation in the tissues of the apical space, and consequently should be avoided in ordinary cases.

E If it is desired to enlarge the apical opening, for applying treatment to the tissues of the apical space, the Twentieth Century apexographer or apex curette, or the Kerr apex file (*Fig. 258*) is a valuable instrument. The first size is passed through the apex and repeatedly withdrawn, thus enlarging the opening. Now, changing to increasingly larger sizes the desired result is obtained.

532. Describe the *Technic* for small canals and difficult cases.

A In small canals, where entrance with the pathfinder and the barbed canal cleanser is difficult, change to a spiral broach reamer, a twist broach, a Kerr root file (*Figs. 259, 260, 261*), or Twentieth Century rat-tail file. Start with the smallest size, carefully boring in and withdrawing in a direction which will tend to straighten the canal, gradually changing to larger and larger sizes, until the canal is thoroughly opened. (*Fig. 262.*)

B In difficult cases a forty per cent. solution of sulphuric acid, hydrochloric acid, or phenol-sulphonic acid carried into the canal on the broach, will, by uniting chemically with the calcium salts of the dentin, soften the walls of the canals and render the work easier. The action of these acids should be neutralized on completion of the operation with a saturated solution of sodium

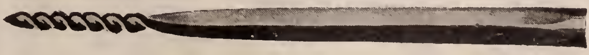


Fig. 258—Enlarged view of Kerr apex file.

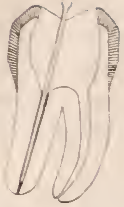


Fig. 258a

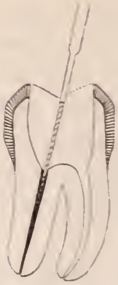


Fig. 262

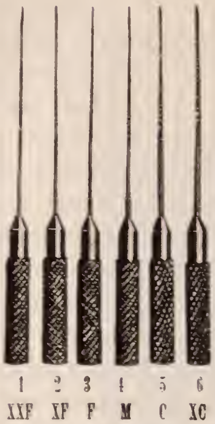
Fig. 258a—Enlarging the apical foramen.

Fig. 259—Kerr pulp canal files.

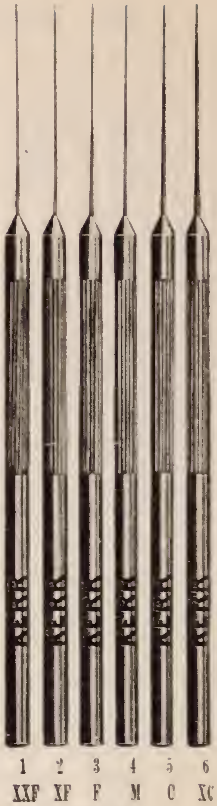
Fig. 260—Kerr pulp canal files.

Fig. 261—Enlarged view of Kerr pulp canal file.

Fig. 262—Enlarging and straightening the canals.



Style C
Fig. 259



Style D
Fig. 260

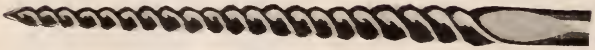


Fig. 261

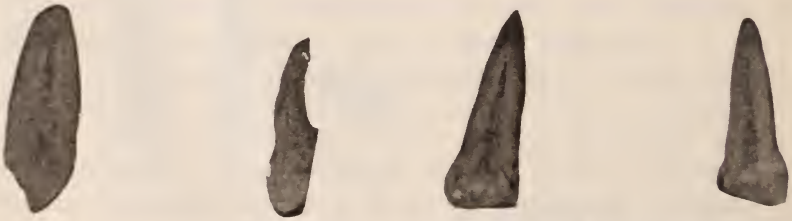


Fig. 262a—Pulp nodules and secondary dentin formations in pulp chambers and canals.

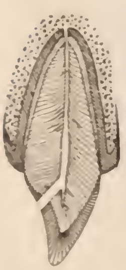


Fig. 263

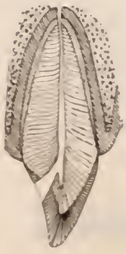


Fig. 264

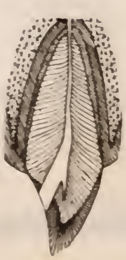


Fig. 265

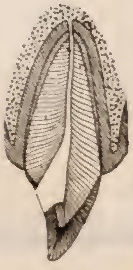


Fig. 266

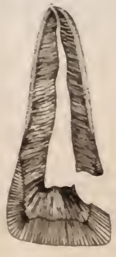


Fig. 267

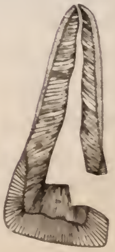


Fig. 268

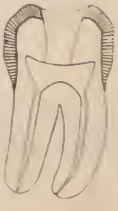


Fig. 269

Fig. 263—A series of illustrations showing the steps in opening the pulp chambers and canal in a central incisor. First, drill through the enamel and dentin to the pulp chamber and then enlarge the opening with drills or burs of gradually increasing diameters.

Fig. 264—Second step. Enlarge the opening previously made with a fissure bur, cutting both gingivally and incisally, as well as laterally.

Fig. 265—Third step. Straighten the approach to the canal by cutting gingivally. This may be accomplished with fissure burs, root-canal cleansers and files.

Fig. 266—Fourth step. With a dentate fissure bur enlarge the approach incisally and remove the horns of the pulp chamber. The canal is now ready for cleansing.

Fig. 267—Two illustrations showing the enlargement and straightening of the entrance and approach to the pulp chamber and canal in a central incisor. A cavity is present on the mesial surface leading into the pulp chambers.

Fig. 268—Straighten the approach by cutting gingivally with a fissure bur, barbed broach, canal reamer or file. Next enlarge the cavity incisally and remove the horns of the pulp chamber by means of burs. The canal is now ready for instrumentation.

Fig. 269—One of a series illustrating steps in the technic of opening the pulp chamber and canals in a lower molar. In this figure the approach to the pulp chamber is too small.

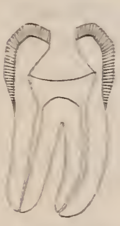


Fig. 270

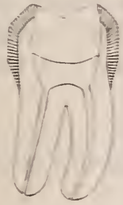


Fig. 271

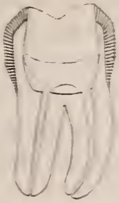


Fig. 272

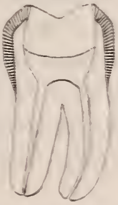


Fig. 273

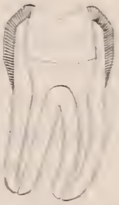


Fig. 274

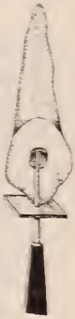


Fig. 276

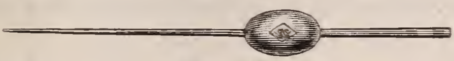


Fig. 275

Fig. 270—The entrance to the approach is too small to perform proper root-canal intrumentation.

Fig. 271—The cavity has been properly enlarged and the pulp chamber is now ready for opening.

Fig. 272—There has been too much enlargement of the pulp chamber, especially on its floor.

Fig. 273—The cavity and pulp chamber have been properly opened and made continuous and smooth.

Fig. 274—The canals have been enlarged from their entrance throughout their length. The cavity, chamber and canals are now continuous, smooth, and ready for filling.

Fig. 275—Riethmuller root-canal drier.

Fig. 275a—Canal points forced into the antrum.

Fig. 275b—Canal points forced into an abscess cavity.

Fig. 275c—"Wandering" gutta-percha canal filling.

Fig. 276—Measuring the length of the canal and the diameter of the apical foramen.

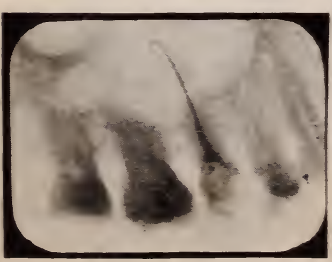


Fig. 275a

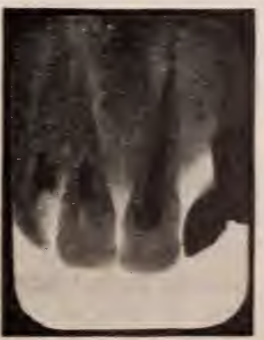


Fig. 275b

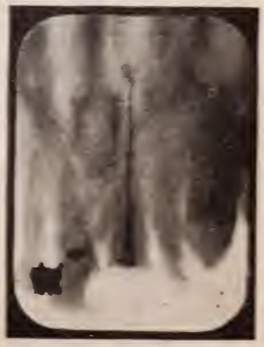


Fig. 275c

bicarbonate. This latter preparation also produces effervescence, which assists in removal of the debris from the canal. For enlargement of the canals, sodium-potassium and sodium-dioxid also may be used. (*Fig. 262a*).

C Remove all debris, apply the diagnostic wire and obtain a radiograph.

D After the proper medicinal treatment has been given, depending on the conditions present, as already described, the canals are ready for drying and filling. For illustrations showing progressive technic in opening pulp chambers and canals see *Figs. 263 to 274 inclusive.*

533. Describe the *Technic* of wrapping cotton on smooth broaches.

The method varies, depending on whether the cotton, containing some medicament, is to be temporarily left in the canal, or whether it is to be immediately withdrawn on the broach, as in swabbing or drying the canal.

First, when the Cotton is to be left in the Canal.

A Place a few wisps of cotton on the pulp of the forefinger of the left hand.

B Lay a round or square smooth broach on the cotton, allowing the end of the cotton to extend slightly beyond the point of the broach.

C Rotate the broach to the right with the thumb and fingers of the right hand, at the same time rolling the cotton in the same direction with the thumb and forefinger of the left hand. Roll the cotton fairly tightly at the point of the broach and loosely the rest of the way.

D Fold the slight excess of cotton left at the end of the broach as before, so as to thoroughly cover the point of the broach.

E Carry the broach containing the cotton as far as possible into the canal to be treated.

F Rotate a turn to the left, at the same time withdrawing the broach a short distance, when the cotton will be disengaged.

G Pack the cotton further into the canal by pushing the broach slightly forward, and then, again rotating to the left, withdraw a short distance, continuing in this manner until the broach is entirely free of the canal and the cotton remains in position.

Second, when the Cotton is to be withdrawn on the Broach.

A File off the sharp point of the broach, or nick it off with a pair of scissors, or roughen its sides with a metal file, so that the cotton will be held more securely.

B Wrap the broach with the cotton as already described, except that it should be wrapped tightly throughout the procedure.

C Carry the broach into the canal, and on withdrawal, rotate to the right, when the cotton will remain on the instrument.

D To remove the cotton from the broach, grasp it firmly between the thumb and forefinger of the left hand and twist the broach to the left with the right hand.

METHODS OF FILLING CANALS

534. What *Conditions are Essential* before canals are ready for filling?

It is necessary that the canals to be filled have been thoroughly opened and treated under aseptic precautions, the saliva excluded throughout the course of treatments, all debris and remaining decomposable material removed, and absolute dryness accomplished.

535. Describe the method of *Drying Canals.*

Wrap a few shreds of cotton on a smooth broach and swab out the canal, absorbing all moisture possible by changing the cotton on the broach as often as necessary to accomplish the result; or dry with repeated applications of paper points, made by the manufacturers for this purpose. Then force in a current of hot air from the heated bulb of the chip blower, or use some of the various forms of root-canal driers (*Fig. 275*), until absolute dryness is accomplished, when the canals are ready to fill.

536. What are the *Requisites* of a good canal filling material?

It should be:

First, non-irritant to the tissues of the apical space.

Second, indestructible in the fluids entering at the apex, or through the pulp chamber (in case of leaky fillings).

Third, easy of introduction.

Fourth, antiseptic or aseptic.

Fifth, colorless.

Sixth, easy of removal (in case of trouble arising later).

Seventh, it should be negative to the penetration of the Roentgen-ray.

537. What general rules should be followed in *Filling Canals?*

Endeavor always: (a), to completely seal the apical foramen; (b), avoid forcing the material through (*Figs. 275a 275b and 275c*); and (c), to so adapt the material to the walls of the canal that all air will be excluded, and the canal for its entire length be hermetically sealed. The radiograph is valuable in "checking up" root-canal work at its termination.

538. Describe *Black's Method* of filling large canals.

This method has been largely abandoned, except in special cases of very large canals or foramina which are easily accessible to instrumentation.

A Measure the diameter of the apical foramen. Pass a small, smooth broach or canal plugger, to the apex. If it passes through, change to a size larger, or two sizes larger, continuing until one is found which will pass just short of the apical foramen. The diameter of the instrument will thus correspond to the diameter of the canal at the apex.

B Measure the length of the canal. Pass a small, smooth broach, or a hooked extractor, if the size of the canal will permit, to the apical foramen, catching the hook over the apex, if the latter instrument be used. A small piece of cardboard or rubber dam encircling the shaft of the broach is moved until it is in contact with the crown of the tooth, when, the broach being withdrawn, a measurement of the length of the tooth is seen, and a guide as to the length of the canal is obtained. (*Fig. 276*).

C Select a tapering gutta-percha cone, approximating the size of the canal, and cut off its end, until it is the size of the apex as previously determined.

D Cut off a section about three or four millimeters in length, which will be utilized for filling the apical portion. Also cut the rest of the cone into small sections for filling the balance of the canal.

E Wrap a smooth broach with a few shreds of cotton, dip it in eucalyptol and freely moisten the canal. Avoid too much cotton, on account of the tendency to form a piston and force the solution through the apex. Remove all excess of eucalyptol with a broach wrapped with dry cotton, or an absorbent point, leaving the wall slightly moistened with eucalyptol.

F Catch up the smallest section of the gutta-percha cone on the end of a warmed root-canal filler (*Figs. 277 and 278*), dip it in eucalyptol, remove the excess, carefully carry it to place and tamp to position, withdrawing the plugger, when the apical portion is filled.

G Continue the procedure with the next largest pieces in order, carefully packing to position, and warming the largest pieces, until the canal is filled; then seal the pulpal opening with a warm plugger or burnisher.

H Fill the pulp chamber with oxyphosphate or oxychlorid of zinc cement.

539. Describe *Buckley's Method* of filling canals.

A Moisten the canal with eucalyptol.

B Dip a small, smooth broach, on which are wound a few fibers of cotton, into softened euca-percha and pump the canal as full as possible, avoiding forcing the material through the apex.

C Force in on a smooth broach, squared on the end, a small section of a gutta-percha cone, as large as the canal will accommodate, and seal the entrance to the canal with a warm canal plugger or burnisher.

D Fill the pulp chamber with cement.

540. Describe *Callahan's Method* of filling root canals.

After burning out the organic matter from the tubules and accessory canals with forty per cent. sulphuric acid, followed by a saturated solution of sodium bicarbonate, and drying thoroughly, pump the canal full of chloroform and resin mixture (resin twelve grains, chloroform, three drams). This mixture permeates and seals the orifices of the tubules and accessory canals. Then take a gutta-percha point of suitable size, insert into the canal while the resin is still liquid, and by a pumping

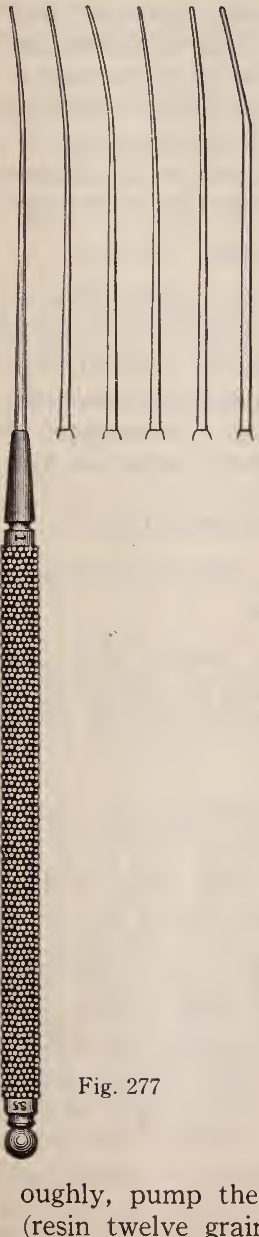


Fig. 277

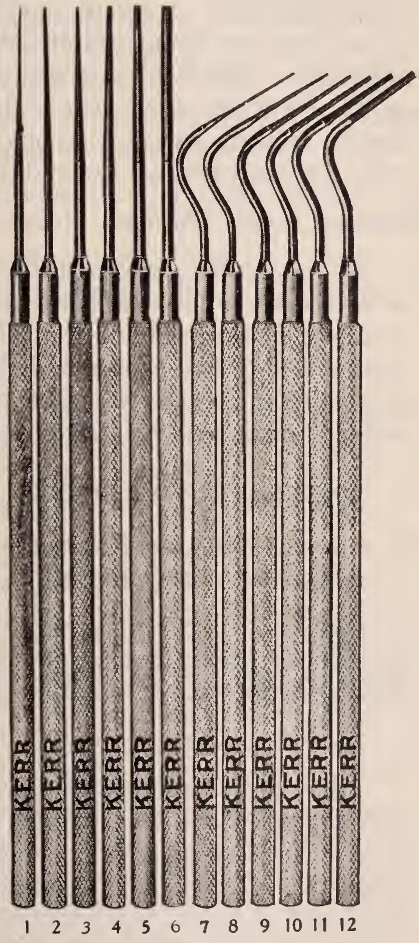


Fig. 278

Fig. 277—S. S. White pulp canal pluggers.
Fig. 278—Kerr pulp canal pluggers.

motion frequently repeated (forty to sixty times), dissolve the point in the solution until the canal is thoroughly filled, thus further forcing the resin solution into the tubules, and filling the main portion of the canal with the gutta-percha, which is slowly transformed into chloro-percha by gradually becoming dissolved in the solution. A recent modification of the Callahan method is to pump the canal full of chloro-percha after insertion of the chloroform and resin mixture, and then insert a gutta-percha point of suitable size. Also, if the apical foramen be large, it may first be filled by tamping in place a small section of gutta-percha point, to avoid forcing resin and chloro-percha through the opening.

541. Mention some *Additional Materials* for filling canals.

Chloro-percha; oxychlorid of zinc cement; paraffin, alone or mixed with salol, aristol, or iodoform; salol; Prinz' root-canal filling (composed principally of bismuth and paraffin) have all been recommended. *Chloro-percha preparations, as well as the resin solution, for canal filling should have a small percentage of bismuth sub-nitrate added to them, else they do not show properly under the X-ray.*

COMPLICATIONS ARISING DURING CANAL OPERATIONS

542. Describe the *Technic of Filling Perforations* of the chamber or canal. *First, perforations high up in the canal.*

Sterilize, dry, and gently fill with melted, antisepticised paraffin, or chloro-percha; afterwards filling the rest of the canal with gutta-percha or metallic points, where deemed advisable.

Second, low perforations.

Enlarge the perforation from within, and, after sterilizing and drying, close the opening with a small ball or plaque of aseptic gutta-percha, or in some cases with copper cement or amalgam. Occasionally a small thin disk of gold may be burnished and sealed to place with chloro-percha or oxyphosphate of copper cement, and covered with the material used to fill the canal. In canals requiring a pin, the pin may be made smaller than the canal, covered with a coating of wax, the canal gently filled with soft copper cement, the pin carried into place, heated, and withdrawn after the cement hardens. When included in an inlay or other attachment, the pin may then be cemented into place. If it is not necessary to remove the pin, as in cases of pins for anchorage of amalgam fillings, it will not be necessary to wax and remove the pin, but it is at once cemented permanently into place. In cases of fistula in connection with the perforation, after proper treatment of the fistula it may be enlarged and, after filling the canal, the perforation may be enlarged with a bur through the fistula and filled with amalgam. This method is especially applicable to anterior teeth or localities easily reached.

Third, perforations of the chamber.

Gently cover with a disk of softened gutta-percha, or seal a small disk of gold over the opening with chloro-percha or copper cement, later covering it with the cement used to fill the chamber. *However, the filling of perforated chambers and roots is, in the majority of cases, of doubtful utility, owing to the increased tendency to infection. In most instances the teeth had better be extracted.*

543. What *Accidents* are liable to occur through carelessness in opening canals?

Perforation of the root, either laterally or *via* the apical foramen, breaking of broaches or reamers in the canal, and infection of the soft tissues.

544. How should these be *Avoided?*

By careful manipulation, aseptic methods, the avoidance of forcing infected pulp tissue through the apical foramen, the use of high-grade broaches and other instruments, careful testing and sterilizing of these before use, and avoidance of engine reamers wherever possible.

545. Describe *Technic of Removing Broken Instruments* from root canals.

If lying loosely in the canal, a new barbed broach, extra fine, sometimes may be passed to one side and the instrument "jigged" out. A few shreds of cotton, wrapped on a small, smooth broach, will sometimes accomplish the same result. Moving the broken instrument back and forth, if it is loose, and pumping sulphuric acid, phenol-sulphonic acid, sodium dioxid, or sodium and potassium alloy about it will sometimes loosen it. In some cases a small bur may be carefully used to drill around the instrument and help to loosen it. If the instrument be still tightly fixed in the canal, seal in for twenty-four hours sodium chlorid, ticture of iodin, or the previously-mentioned preparations, in the hope of chemically disintegrating the steel, when an attempt may again be made to dislodge it. In some instances the Howe split and threaded instruments may prove serviceable. In case all attempts fail, the operation of apicœctomy may be attempted in suitable cases.

546. Describe the Technic for *Removing Old Canal Fillings.*

A Gutta-percha Preparations. Heat a canal plugger or smooth broach. Soften the gutta-percha with it and remove with barbed or twist broaches, continuing to heat and broach out the contents of the canal until all, or as much as possible, is removed in this manner. Chloroform, or preferably xylol frequently pumped into the canal will also be of assistance. In some instances it will be advisable, if the above methods fail, to seal in chloroform or xylol for twenty-four hours and continue the process at the next sitting.

B Cement Preparations. Soften with dilute sulphuric acid and remove with broaches, in a similar manner to that described above. The sealing of the acid in the canal until the next visit often will be of assistance.

C Paraffin and Wax Preparations. Soften by heat and broach out.

(*To Be Continued*).

REPORT OF THE COMMITTEE ON DENTAL SCIENCE AND LITERATURE

CALIFORNIA STATE DENTAL ASSOCIATION

DR. F. V. SIMONTON, SEC.

(FOR THE DENTAL SUMMARY)

DENTAL PATHOLOGY AND HISTOLOGY

By Dr. John A. Marshall

"Some Recent Advances in Oral Pathology" (Arthur Hopewell-Smith, ScD., L.R.C.P., M.R.C.S., L.D.S.,—*The International Journal of Orthodontia and Oral Surgery*, January, 1921, Volume VII, No. 1, page 19).

The paper constitutes a carefully-prepared review upon dental caries, pyorrhea alveolaris and diseases of the dental pulp, presented in the order of their relative importance. Although the doctrine of certain former experimenters appears to be correct, it is pointed out that there is a vital necessity for the further study of the etiology of caries. The author directs attention to a resolution passed by the Third International Dental Congress, in Paris, reading as follows: "Our present knowledge of dental caries cannot explain the different forms of this malady." The paper states that dental caries does not resemble in the slightest degree caries of bone. On the contrary, instead of being a disease, it is a manifestation of a result arising from certain pathologic conditions affecting the environment of enamel and dentin. The author's definition of dental caries is based upon the statement that he believes this condition to be the result "of a complication of the pathological condition produced by disharmonious relations existing at times between the various kinds of oral bacteria."

Bacteriologists know that any given environment may be favorable for the development of more than one species of organism. The bacteriological investigations of water, milk, or various organic preparations may demonstrate the presence of different groups of bacteria in the particular sample under investigation. In other words, a symbiotic relation exists. When unfavorable conditions occur in which, for example, the food supply is limited, or waste products not removed, some of the varieties will succumb and a few or, perhaps, only one prevail. In this last case the word anti-biotic explains the condition.

The author believes that these symbiotic relations have a definite application to dental caries. They are perhaps controlled: First, by the difference in the amount and quality of salivary activity of the adult. He states that the glandular apparatus of the child is inadequate in its response to the stimulation of food and of muscular movements, while that of the adult, on the other hand, is such that a copious flow of saliva may be produced on the proper excitation of the secretory nerves.

The second point which the author emphasizes is the fact that phagocytosis is more effective in the adult than in the child because the tonsils have attained their complete development. He believes that the leucocytes in the mouth are derived from the tonsils. In the case of the child phagocytosis probably does exist to the same degree.

Third, as a corollary to the preceding, it is stated that the physiological resistance of the adult is probably greater than that of the child.

Fourth, the differences in the quality and character of the food for the adult are such that in mastication, more of the organisms become incorporated with the food and thus are carried to the stomach. Finally, the laws of oral hygiene are more frequently and effectively obeyed in the older person. In the discussion, Dr. Hopewell-Smith made the observation that caries is more prevalent in individuals from ten to twenty-five years than at any other time.

The discussion of pyorrhea alveolaris centers around the diagnosis of this condition. It is pointed out that a microscopic examination of pus from the pockets should be made. It is of equal importance to have a blood count and to be able to apply intelligently this information.

In discussing the diseases of the dental pulp, the author observes that the agencies responsible for these various conditions are those concerned with disturbances of the circulation and innervation of the tooth. The factors involving the general predisposing causes are grouped under heredity, sex, age, marasmus and long continued fevers. Of the local predisposing causes mention is made of the lack of collateral circulation, of the valveless construction of the veins, of the lack of an organized lymphatic system, and to other anatomical and pathological characteristics.

"Safe and Sane Dentistry," by Percy R. Howe, DENTAL SUMMARY, January 1921.

In this paper Dr. Howe discusses the relationship of the dental abscess to general systemic effects which some experimenters and clinicians claim to have observed. The methods which Rosenow employed to prove this relationship are compared to those of other authorities who have disproved some of the statements made by Rosenow.

Mention is made by Dr. Howe of the results obtained upon experimental animals which were fed a diet deficient in vitamines. The paper does not describe the method of laboratory procedure but illustrations of teeth and jaws are presented which indicate the effects of this restricted diet on animals. The fact is emphasized that teeth are necessary and essential factors in nutrition, and when losses of teeth occur the very first act of digestion is altered. He maintains that root canals may be successfully treated and observes in passing that the amateur radiographer is a *liability* of dentistry rather than an *asset*. The paper contains a description of the details of the Howe treatment and of the efficiency of metallic silver as an atiseptic agent.

THE GOLD INLAY

By F. V. Simonton, D. D. S., San Francisco, Cal.

A review of an article by Geo. H. Means, D.D.S., Louisville, Kentucky (which is in turn a review of the investigations of the Louisville Unit, Wm. E. Goepper, D.D.S., chairman). THE DENTAL SUMMARY, January 1921, pp. 24 to 32, inclusive.

In this article the writer calls attention to the fascination of inlay work because of the uncertainty of results, and the mystery back of many of the factors involved. He feels that it is fortunate that this type of work is so interesting because he is impressed with the tremendous possibilities of casting.

The gold inlay is regarded as the initial step in the art of casting. It is necessary to master the intricacies of casting a perfect inlay before success can be expected in casting larger restorations.

CAVITY PREPARATION

Dr. Means recommends the Black cavity preparation modified so as to eliminate undercuts and prevent flaring walls. He advises beveling of the margins. A wax pattern of the cavity studied after removal under a magnifying glass is suggested as a test to show imperfections in the cavity.

INLAY WAXES

This is the most important step in the inlay operation. The waxes of the various manufacturers are all satisfactory. But they may be spoiled by faulty technic. Inlay waxes are composed of beeswax, paraffin, resin and coloring matter combined in correct proportion. Alone none of the ingredients is suitable but combined properly an ideal wax compound is produced. The application of too great heat volatilizes the paraffin, lessens the toughness and brittleness of the wax and produces the undesirable property of adhesion.

Moist heat is undesirable because it lessens the cohesion, causes the wax to flake while carving and makes it difficult to add more wax when necessary. The ideal method is to soften the wax at a low temperature away from contact with the flame.

A device suitable for this purpose can be made by preparing a metal box with a hole in the top fitted with a cork, through which a thermometer is inserted. On the under side of the cork are pins upon which the wax is impaled while being heated.

The temperature recommeneded is 130 degrees F. cooling to 125 F. This is a very satisfactory temperature for the Maves' and Kerr's inlay waxes which are the types preferred by the Louisville unit.

Previous to warming, the wax should be cut to the shape of a wedge, a cone or a U as the case may require. Do not manipulate in the fingers. Use a matrix in taking impressions of step cavities in bicuspids and molars.

Immediately after the pattern has been formed and carved it should be invested. A sprue of 16-gauge wire is satisfactory.

INVESTING

The investing material should have considerable hardness after being burnt out, otherwise the mold may be distorted by the force of casting. Very fine grade silex mixed with equal parts by weight of Kerr's Snow White Plaster makes a satisfactory investment material. The silex No. 27 grade can be procured from Whitaker, Clark and Daniels, 250 Front street, New York City. This investment should be mixed in the proportions of two and one-half dwt. of investment to thirty min. of water, the ingredients being spatulated together on a glass slab. This somewhat different method of mixing is thought to obviate the presence of air bubbles more effectively than jarring and rotating in a bowl.

The dry pattern is then painted with investment, blowing upon it until the wax is completely covered and free from air bubbles. This investment is built up until the pattern is covered to a depth of a quarter of an inch on all sides. It is then set aside until the glaze has disappeared and then invested in the ring using as a filler, Brophy's Imperial Crown and Bridge Investment.

BURNING OUT PROCESS

The author of this article believes that the investment should never be exposed to the open flame and that the wax should be dissipated without producing the least disturbance within the mold.

After the investment has set for half an hour it should be placed, with spru "*in situ*" in a cigar box or other container with an electric light globe and left for half an hour. It should then be placed on a hot plate, electric stove or gas oven and heat applied until the investment smokes. This heat should be maintained until the smoking ceases. The investment should now be allowed to cool and a casting can then be produced which will come from the mold so bright that it hardly needs any cleaning with acid.

CASTING

Dr. Means believes that the more rapidly a casting cools the less will be the shrinkage, consequently he advises,—casting into a cold mold; a relatively thin investment and quick melting of the gold; recommending for this latter purpose a gas-oxygen flame.

Dr. Means also brings out a very interesting and, I believe, novel thought, in that, discrepancy in the inlay may be produced by a rebound of the gold as a result of too great force in casting. He argues that the gingival "shrinkage" is caused by this rebound, since the occlusal portion of the inlay is locked by the dovetail while the gingival has no dovetail and is free to rebound.

Dr. Means doubts the theory that contraction occurs where the gold is last to congeal, that is, near the sprue. He believes that this is caused by the "rebound." He emphasizes the fact that the gold used for castings should be clean. After the cleansing of an inlay with acid, neutralize the acid, thus avoiding the possibility of remaining acid causing disintegration of the cement.

TREATMENT OF PULPLESS TEETH

By Percy R. Howe, A. B., D. D. S.

Ideas upon the treatment of pulpless teeth are in a most chaotic condition. Some go into too elaborate preparation for treatment of pulpless teeth, and others give it up entirely and extract every pulpless tooth.

If the structures to be dealt with are understood, it is a simple matter. In root-canal work, so treat the organic part of the tooth substance that it is as free from decomposing material as possible and protect the remaining tissue against further decomposition. It is the organic substance of the tooth that concerns us in root-canal work. The author states that the tubuli form a large part of the organic material of the tooth. These tubuli do not run in an exact mathematical plane and have many branches and anastomose.

When the pulp dies, if it is a slow procedure, the structure of the tooth itself is changed. The tubuli disappear in certain areas, the areas becoming hyaline in structure. These tubuli have to be treated. Before the canal has been our only objective. The tooth substance itself must be treated, because it is undergoing degenerative change and contains infection.

Staining and rendering a tooth transparent shows the many points of inlet and outlet at the apical region. Many branchings also occur in he canal and the apex is not always where the main outlet will be found.

It is impossible to clean out all organic material in pulp canals. The endeavor to open a tooth to the apex often has resulted in making artificial openings, causing more trouble than the work of men who have "treated" the canal contents, and placed no canal-filling at all. Leaving canal unfilled is not advocated, but, the present work in the apical region is not always productive of good results. With all this discrepancy a large percentage of root treatment has been successful for many years.

There is nothing to be gained by forcing foreign material through the apex, but traumatic injury, and predisposing such tissue to further disintegration and infection.

With the metallic silver reduction, all the various diseased canals are sterilized and blocked by the finely divided metallic silver no matter how fine they may be. This includes the diseased tubuli also. It does not enter sound tissue, because it contains coagulable material. It has had extensive trial and been found successful.

PREPARATION OF MATERIAL—TWO SOLUTIONS

First—Silver in a form quickly and fully thrown down (silver oxid in ammonia).

Second—Agent to throw it down (organic material such as eugenol or 10 per cent. formalin).

The combination of silver oxid and formalin is what causes sterilization.

Principles of use—All mechanical ideas must go; rely on chemical and physical principles. This material is intended for use within the tooth. The minute anatomy of the tooth must be reached and all diseased organic matter.

No broaching is required; capillarity is relied upon. If the air lock is removed, and if enough solution is used, the material will run up the canal.

Use—(a) Putrescent pulp; apply the rubber dam; clean bulk of debris. Dry and varnish, covering entire tooth down to pulp chamber; fill cavity full of silver solution. Allow it to remain three minutes; if it is taken up by tooth, apply more. The object is to saturate the diseased tooth structure and pulp also. Add a little formalin; allow to remain a minute or more. Absorb excess. Repeat procedure. The region reached is sterile. Elaborate procedure is not necessary for sterility. The sterilizing agents are in field of operation. The pulp becomes sterile in a few moments and the instruments used in it are sterilized also. Dry and remove bulk of putrescent material; reapply solutions; dry out and put in eugenol, drying this in.

The tooth is sterile, and blocked by finely-divided silver in a most perfect manner. Fill canals with anything you like. Finally apply solution of iodid of potash to remove possibility of staining from any remaining silver solution. The varnish is removed with alcohol.

(b) One putrescent canal; one vital,—treatment same as (a), put material in vital canal with broach; the slight pain is over in a moment. All organic matter is now removed. Remove all you can and the remaining part will become a stiff dry mass of sterile albuminate of silver.

(c) In case of abscess; treat as in (a) to remove original cause of trouble. Syringe through or into abscess with Dakin's solution.

RADIUM—A NEW ELEMENT IN THE SAFETY MOVEMENT

Radium, the most mysterious and most powerful element known to science, which has the greatest power of all discovered sources of energy, has now been linked with the safety movement and will lend its power to the prevention of avoidable accidents. So great is its power that one gram is sufficient to raise a ton of water from the freezing to the boiling point. If one ton of it were harnessed to a ship equipped with 1500 H. P. engines, the ship would be propelled at the rate of 15 knots an hour for thirty years.

Radium is best known to the world through its curative properties in the treatment of cancer and through its commercial value in making radium luminous material. The power of radium was made known only a few years ago through the efforts of a Polish woman scientist and a French and an American professor. Radium now treats thousands of cases of cancer annually, preventing death and eliminating a great deal of suffering.

Radium's role in industry as a life saver is less spectacular, but perhaps even more important than it is as a thereapeutic agent. The great mass of accidents in factories, in mines and in other industrial institutions where darkness is a creator of danger, are being eliminated through the newest invention of science—radium luminous material. Radium illuminated watches are familiar articles. The same material that illuminates these is now being employed in great factories on all power line switches where fumbling might mean electrocution to the operator.

High pressure gauges which are installed as an insurance against dangers are deprived of a great deal of their safety value through inconstant lighting. Their dependability as indicators is increased tremendously through making them safe twenty-four hours a day by the application of radium luminous material, which is invariably luminous in the dark. Steam gauges and water gauges of all sorts are making use of radium to increase safety.

Electric switches often are set in places which are unlit. This includes electric lighting equipment which usually is visible only after the light it controls has been turned on. A spot of radium luminous material on the bottom of switch makes them easily located in the dark, so that in emergency they may be made use of quickly.

Likewise, a fire alarm or a fire extinguisher is deprived of a good deal of its efficiency through being invisible in the dark. Radium luminous material acts as a quick locator for them. Telephones which are often necessarily found quickly in the dark in emergencies, various emergency call bells and revolvers are made more useful through the application of undark. Gun sights illuminated insure accuracy of aim in the dark. The need of luminating poison bottles so that they may stand out warningly in the dark has been demonstrated too often to need further dwelling on. An interesting safety device is the safe combination whose dial is radium luminated so that no artificial light need be used for it.

The industrial uses of radium luminous material are many. Bolts that are necessarily attached to the dark under-portions of machines and equipment are being touched with dabs of this luminous material with a consequent great saving of bloodshed. In mines where the carrying of oil lamps or the placing of electric lighting equipment is not feasible, radium has been found to be a boon to humanity. There are dark corners in the dark underground channels which miners must traverse, corners where danger lurks—these are made safe through the unvarying luminosity of radium.

The value of radium to mariners is commencing to be recognized. Not only the compass dials but the steering wheels, the gauges and other instruments which should be instantly and uninterruptedly visible have been touched with radium. Motorists, motor cyclists and the operators of any machinery which has indicating dials or gauges which tell of the speed of the motor or the quantity and mixture of fuels and oils, are finding the solution of their difficulties in radium luminous material. The hazard of uncertainty has been reduced.

While radium is the most valuable element in the world—a gram of radium, which is about a thimbleful, costs $120,000, as opposed to $150 for an ounce of platinum. So powerful is it when mixed with other materials that even the minutest particle is effective in making material self-luminous for years. It is this quality which makes radium luminous material commercially possible.

The great value of radium is due to its scarcity and to the great difficulty in isolating it after it has been found. Much of the radium of the world is now found in America in carnotite fields. A great portion of this comes from the Undark Radium mines in the Paradox Valley of Colorado.

The ore is found in narrow seams in the ground. It is sorted and packed in one hundred pound sacks and transported sixty miles to the nearest railroad station on the backs of burros and mules. Thence it is shipped in carload lots 2,900 miles across the continent to an extraction plant in Orange, N. J.

Two hundred and fifty tons of ore treated with an equal amount of chemicals and water yields one grain, which is about the size of a pin head.

The power of radium lies in the penetrating character of its rays which disintegrate and travel at the rate of 3,000 miles a quarter of a second.

In addition to the use of radium luminous material on machinery in industrial plants, it is used extensively for the marking of any corner or spot which should be visible in the dark. Angles of tables and chairs, corners in rooms, numbers to indicate cubby-holes or doorways on which there is no other illumination are touched with a spot of undark. Even the valuable electric torch increases its efficiency when it has a touch of radium on it so that it can be reached instantly in an emergency in the dark.

When other lights fail, when fuses blow out, wires break down—radium will glow dependably without danger of explosion or of burning.

The employment of radium to help solve our medical and industrial problems of life safety is as yet in the first stages of its development. What the future will bring, no one knows.

WOODBURY STUDY CLUB

This Club was organized in May 1906, with 25 charter members to meet twice a year for two- or three-day periods, for the study of cavity preparation and manipulation of gold foil. This is the first public clinic that the group has ever held. The operators were Dr. R. N. Anderson, Cedar Bluffs, Nebr., Dr. W. H. Kenderdine, Sioux City, Iowa, Dr. R. E. Dooley, Fremont, Nebr., Dr. H. G. Bolks, Sioux City, Iowa, Dr. H. P. White, Sioux City, Iowa, Dr. H. E. Latcham, Jefferson, Iowa, Dr. F. W. Shaefer, Omaha, Nebr., Dr. J. M. Prime, Omaha, Nebr., Dr. F. J. Despecher, Omaha, Nebr., Dr. J. H. Davis, Sioux City, Iowa, Dr. L. S. Peek, Fontanelle, Iowa, Dr. C. H. Heyne, Lyons, Nebr., Dr. L. E. Meyers, Omaha, Nebr., and Dr. C. H. Cressler, No. Platte, Nebraska, under the supervision of Dr. C. E. Woodbury. The clinic was in charge of Dr. F. J. Despecher.

WOODBURY STUDY CLUB

This organization has done much good in developing gold foil operators in this district. Among the men who have appeared before the Club as demonstrators in this work are Dr. E. K. Wedelsteadt, of St. Paul, Minn., E. C. Searle, of Owatonna, Minn., John F. Conzett, of Dubuque, and Wm. Finn, of Cedar Rapids, Iowa.

Dr. C. E. Woodbury served as President and E. H. Bruening as Secretary for thirteen years. The present officers are H. E. Latcham, of Jefferson, Iowa, President, F. J. Despecher, Vice-President and F. W. Schaefer, Secretary-Treasurer.

To Dr. C. E. Woodbury's untiring efforts and sincere interest in this department of dentistry is due the remarkable success of this organization.

The Nebraska State Society passed a resolution setting aside sufficient funds to probably pay the expenses of each operator's assistant if the Club will agree to repeat this Clinic before the National Meeting in Milwaukee in August.

CHARTER MEMBERS

Dr. Leah Mills, Omaha, Nebr., Dr. M. E. Vance, Lincoln, Nebr., Dr. O. H. Cressler, No. Platte, Nebr., Dr. A. H. Hipple, Omaha, Nebr., Dr. P. T. Barber, Omaha, Nebr., Dr. C. E. Woodbury, Council Bluffs, Ia., Dr. J. M. Van Buskirk, Shenandoah, Ia., Dr. R. D. McEvoy, Missouri Valley, Ia., Dr. W. T. Humphrey, Lincoln, Nebr., Dr. F. B. Damron, Lincoln, Nebr., Dr. G. W. Hamilton, Council Bluffs, Ia., Dr. L. E. Gurney, Neola, Ia., Dr. J. J. McMullen, Omaha, Nebr., Dr. F. M. Barns, Omaha, Nebr., Dr. H. E. King, Omaha, Nebr., Dr. R. J. Hunter, Omaha, Nebr., Dr. L. J. Schneider, Omaha, Nebr., Dr. L. G. Van Slyke, So. Omaha, Nebr., Dr. J. H. Wallace, Omaha, Nebr., Dr. E. H. Bruening, Omaha, Nebr.

PRESENT MEMBERS

Dr. H. E. King, Omaha, Nebr., Dr. J. M. Van Buskirk, Shenandoah, Iowa, Dr. P. T. Barber, Omaha, Nebr., Dr. C. F. Rossteuscher, Yankton, South Dakota, Dr. E. H. Bruening, Omaha, Nebr., Dr. J. M. Prime, Omaha, Nebr., Dr. F. J. Despecher, Omaha, Nebr., Dr. F. W. Schaefer, Omaha, Nebr., Dr. R. N. Anderson, Cedar Bluffs, Nebr., Dr. W. H. Kenderdine, Sioux City, Iowa, Dr. R. E. Dooley, Fremont, Nebr., Dr. D. W. Bettice, Spencer, Iowa, Dr. H. E. Latcham, Jefferson, Iowa, Dr. H. G. Bolks, Sioux City, Iowa, Dr. H. P. White, Sioux City, Iowa.

HONORARY MEMBERS

Dr. C. B. Baird, Los Angeles, Calif., Dr. H. A. Merchant, South Sea Islands.

EDITORIAL

A STUDY OF THE RELATIONSHIP BETWEEN DENTAL AND ORAL INFECTIONS AND OTHER DISEASES

We understand that The New York State Dental Society and the Metropolitan Life Insurance Company are co-operating in a study of dental and oral infections as causative factors in certain acute and chronic diseases. The study will be confined to fatal cases. Letters of inquiry are sent to physicians about cases in which the causes of death are diseases which are known sometimes to follow dental and oral infection. The physician is asked to state, in each instance, whether the reported causes of death were direct sequelæ or in any way dependent upon initial infections of the teeth or buccal cavity. When enough replies are received to afford a safe basis for a conclusion, the facts will be tabulated and published. For the present letters of inquiry are being sent out in all cases where any of the following diseases are reported as causes of death:

Infectious arthritis; Arthritis deformans; Osteomyelitis (either when reported without qualification or when reported as located in bones of head or face); Acute articular rheumatism; Rheumatic fever; Infectious endocarditis (also endocarditis returned without qualification); Pericarditis; Myocarditis; Mitral regurgitation (decedents under 50); Septicemia (cause not stated); Anemia (both pernicious, and when returned without qualification); Chronic gastritis (also gastritis, unqualified); Colitis; Peptic ulcer (also gastric ulcer); Meningitis (spinal, cerebral, cerebrospinal, or unqualified); Neuralgia; Skin diseases.

It is recognized that in a considerable number of instances dental and mouth diseases initiate morbid processes in other vital organs which ultimately result in death. In such cases physicians have been known to neglect to record the part which the original infections have played, resulting in few records of authemtic cases where dental diseases caused death. There are, however, many indications that they do play a significant part.

This investigation is instituted to help determine to what extent dental disease is a primary condition, many cases where it is contributory to other primary diseases will, of necessity, be recorded. Later we hope to report to our readers the progress of the investigation and the results.

SUGGESTIONS

CONDUCTED BY F. R. CHAPMAN, M.S., D.D.S., COLUMBUS, OHIO

(To Our Readers: Give others the benefit of your practical suggestions by sending a description of them to Dr. F. R. Chapman, Schultz Building, Columbus, Ohio.)

New Rubber Tubing

I have found that in placing new rubber hose or tubing on bunsen or gas nipple, owing to the stiffness of the rubber, it is very difficult sometimes to slip it over the end. A little oil dropped on the nipple or whatever it may be, will overcome this difficulty and you will be surprised how easily the tubing slips on.—*P. J. Lewis, Lockland, O.*

Care of Hands in Laboratory

Before opening vulcanizer, or working in plaster, or with flasks, if you will wash hands in soft water with good soap, and, while still moist, pour on and rub in olive oil, you will find when you are ready to cleanse the hands that the stains have not penetrated the skin.—*J. M. H., Dental Facts.*

Protecting A Prepared Root

In order to keep the gum from over-lapping the root of a tooth after its preparation for a crown with a post, an ordinary worn screw of a mandrel convered with gutta-percha, heated and pushed into place will remain tight and have the desired effect.—*Hettinger's Dental News.*

A Way to Keep Oil of Cajeput

Many practitioners use oil of cajeput or some other oil for smoothing off the wax model for an inlay before removing from the cavity. To prevent using an excess and spilling the contents of the bottle, take an ordinary medicine bottle, fill with absorbent cotton, pour oil on this cotton until slightly saturated. When the pellet of cotton, held in the cotton carrier is immersed into the oily cotton of the bottle it will not become oversaturated.—*F. S. Dilger, Dental Facts.*

Vulcanite

The practical experience of dentists has proven that the more coloring matter a rubber contains, the more brittle the rubber is, and that a minimum of coloring matter gives the best physical properties to the vulcanized rubber.—*Alfred Gysi, Dental Digest.*

Vulcanizing

We get by the vulcanization below 300 degrees Fahrenheit a more homogeneous vulcanized rubber, free from microscopic bubbles, and at a temperature above 300 degrees Fahrenheit, the rubber is filled with microscopic bubbles of hydrogen sulphid, by which a bad odor is generated. The microscopic bubbles should not be confused with the microscopic porosity which is produced by heating the rubber too rapidly during vulcanization.—*Dr. Gysi, Dental Digest.*

Replacing Pin Facing Temporarily

First select and grind your facing in the usual way. Then solder a small piece of post material across the ends of the pins, affording strength and attachment for the facing. Next grind through the gold a hole large enough to receive the pins. Then place the facing in position and pack with amalgam from the back—*J. Callaway Houchins, Dental Facts.*

Quick Repair for Porous Places in Plates

Whenever you desire a quick repair for porous place in plate, cut out that part, save the fine powder, mix powder with synthetic porcelain, then fill cavity. After this has solidified and is polished it is very difficult to detect place repaired. Use rubber filings from some plate you are to repair.—*C. I. Faison, Dental Digest.*

After Extracting

After a difficult operation patients sometimes develop an osteitis or periostitis caused by mechanical injury to the bones. The symptoms are pain and marked tenderness to touch if the periosteum is involved, attended by more or less swelling. The treatment consists of dry heat or a wet dressing to the face, or the external application of a five to ten per cent. ichthyol ointment, together with the administration of asperin or phenacetin in doses of five grains each, to be repeated every three hours until relieved.—*R. L. Hart, Penn. Dental Journal.*

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Cultivate a financial character. Let your friends and neighbors know that in your mind a debt is a sacred obligation. Then you will have no trouble in establishing a credit that you are sure to find mighty useful some day.

I never have been able to understand the type of mind illustrated by the following incident:

A young man had just been graduated from a theological seminary. He had no money. He wanted very much to get married. He hadn't so much as the dollar necessary to pay for a license. A friend loaned him the dollar, and enough more to pay for a hack with which to meet his wife-to-be at the station and take her to the parsonage. A little later his wife's people sent them a carload of furniture with which to begin housekeeping. The same friend loaned him $52 to pay freight and drayage. He had been given a small charge in a town near the city in which the college was located. His salary was only $600, which did not go very far, even in those days. So, every now and then, he called upon his friend for additional small loans, until the amount reached something over $100. Then he was given a better charge, was successful, advanced rapidly, and at the end of five or six years, was the pastor of a large congregation at Washington, D. C., with a salary around $5,000. Did he break his neck to pay off the debt at the earliest possible moment? He did not. Years passed without a word or a sign from him. He continued to hold a high place in the ministry, still does, so far as I know. He is shrewd, a good politician in a theological way. One day he returned to the college town to attend a synod—twenty years after his graduation. The lender wrote him a note, reminding him of the debt, and suggesting that it would be a good time to pay it, voluntarily waiving all interest, which, by that time, would have amounted to just about double the original loan. No answer. Another note. Silence—and so it stands to this day.

Now, what I want to know is: What sort of mind has that sort of man? A preacher, and yet, from the standpoint of the man with a financial conscience and a financial character, the meanest kind of thief. The highwayman is a respectable citizen by comparison, because victims of that sort of man never have a chance in the wide world.

Of course, there are thousands like him, and not all preachers, by any means, either. This sort of man makes credit departments and stringent collection regulations imperative. The honest man doesn't need 'em; it's the crooked-minded man, whether he wears his collar wrong end in front or not, that makes business difficult.

I used to know another clergyman, president of a college, drawing a large salary for those days and his profession, that simply made it his business to pay nothing that he was not compelled to pay—not by law, but in order that he might buy more. He'd run a bill of, say $10; pay five and buy eight or nine; pay $10 and buy twenty, etc.; always behind, always getting in a little deeper, yet keeping his butcher and grocer in such a state of uncertainty that they did not dare cut him off for fear of losing him and his influence. He finally "went to his reward," eulogized, praised, wept over, owing one grocer over $600, and owing everybody else that had anything to sell that he thought he could use. A preacher; a spiritual leader; viceregent of heaven, etc. To me such a man is not even moral. He approaches perilously near the line of demarcation between a man and a scoundrel. Some may say: "O, that was only in money matters; every other way he was fine." Mebbe; but money matters are precisely the avenues of contact with our fellowmen that count for most.

Did you ever think that a dollar in your hands is merely a symbol of something of value that you have produced, and, in the production of it, have given a certain number of minutes, or hours out of your life that cannot be replaced? That's precisely what it amounts to. And the fellow who takes that dollar from you in any way is robbing you of a part of your life unless he give you something its equivalent in exchange. Suppose you had just ten minutes more to live when some fellow came along and knocked you in the head. He would be robbing you of ten minutes, wouldn't he? What less is the other man doing who takes from you that which it has taken part of your life to produce?

Think on these things.

Somehow, I never could just see the angle at which some people seem to look at religion—those people that we all know, who think and act as though belief of some creed or other is all there is in it, who believe one thing and live another. But, of course, other people's ideas of such things are none of my business, although the lives they live are very much my business, and yours, and every man's who cares a whoop about the progress of the race.

There are many ways of stealing. Yes, I know that's an ugly word, but's no uglier than the act behind it. Why mince matters? Let's call a spade a spade, and be done with it. One of the meanest ways is beating one's creditors. Even the highwayman and the pirate take some chances of getting their skins punctured, and they give their victims some chance also. They may run away and live to be held up another day. But the victim of the deadbeat has no chance on earth. He has been robbed no less, but it has been done in a way that lawyers and the law do not consider criminal. Just the same, the effect on the financial character of the debtor is just as bad, one way as another. And the man who has a lame financial character cannot very well have a robust character of any kind. And here follows a new commandment, with which I close this screed:

Never owe anybody more than you are able to pay:
Never allow anybody to owe you more than you are able to lose.

The new State Board for Utah is made up as follows: W. G. Dalrymple, Ogden; S. S. Byrnham, Bountiful; Clifford Rudine, Salt Lake; Hyrum Bergstrom, Salt Lake and Atlantic Christensen, American Fork. Under the new Utah law, this board is to serve indefinitely, until successors are appointed by the new Director of the state department of registration. Barbers and nurses also are subject to state board examination.

I wonder why dentists do not take advantage of their intimate relations with their patients to make themselves really "health advisers." Of course, that may infringe a little upon the prerogative of the M. D.'s; but most people see the latter only when ill, while they visit the dentist at other times as well. A few words about diet, or exercise, or breathing, or fresh air, or bathing may have a very great influence, and it is no trouble at all to associate all of these things with the teeth. A tooth does not exist for itself nor of itself. Every tooth has a definite relation with every other part of the body, both direct and reflex. It is affected by every bodily condition, and, in turn, has a part in the condition of every other part of the body. Think it over.

The dentists of Grand Forks, N. D., and vicinity have organized a Grand Forks district society, and elected Gilbert Roskau, president.

A bill is before the New Jersey legislature which, if it becomes a law, will take the power of appointing members of the State board of examiners out of the hands of the State society, and give it to the governor as in other States, in which the State societies only recommend certain members. Proponents of the bill say that only about half of the dentists in New Jersey are members of societies, and that the other half is entitled to equal representation on the board. Dissatisfaction is expressed with the action of the present board in flunking 61 candidates of a total of 65, many of them graduates of some of our best colleges, with high standing credited to them. New Jersey isn't very big, but the people down there have the faculty of keeping matters pretty well stirred up.

If anybody wants to reach Dr. R. C. Hall, formerly of Kendallville, Ind., it will be necessary to address him at Pretoria, South Africa, where he expects to practice in future.

California State board recently licensed 76 new dentists, and Oregon 30. The supply of dentists is constantly falling behind the demand. Give this information to your son if he hesitates to follow your footsteps.

Women are said to be "braver" in the dental chair than men. I wonder if anybody ever took into account the difference in the nervous organization of the sexes? This thing of giving credit for bravery is overdone sometimes.

The colored dentists of Mississippi held their annual State meeting at Vicksburg, June 15.

Sidney M. Colgate, Orange, N. J., has resigned from the board of education of that city because a woman was appointed a member. It seems that Mr. Colgate's resignation promises to be a rather costly matter for the city, since he has been paying the salary of the dentist in charge of the free school clinic, $1,600, and has been the donor of thousands of dollars for equipment.

Little Rock, Ark., is planning a ten-story building exclusively for dentists and M. D.'s.

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Milwaukee dentists have refused, almost unanimously, to petition the legislature to allow them to prescribe whiskey. Thank you, Milwaukee. If you don't want the privilege, the rest of the country can do without it.

Heard of a bear the other day who wore a complete set of artificial dentures, made for him by a dentist. They had to be cemented to place. Wonder what kind of glue that dentist used. It might be useful in human dentistry. I've seen many plates that needed glue or something. An American dentist practicing in India writes that many of the dentures he sees in the mouths of his American patients are "disgraceful." To a mere layman the statement seems redundant with truth.

Keep an eye in the direction of the Toledo dental society. The new president, Dr. Walter H. Hisey, has some things up his sleeve that are pretty sure to distinguish his incumbency.

They are still at it up in Washington. The superior judge at Olympia has issued an injunction restraining the issuance of licenses to applicants who have just passed the State board, on petition of the "outsiders," who allege that the State law gives the examining board autocratic powers, and therefor unconstitutional. Three federal judges sustain this contention. The injunction also prohibits the payment of the salaries due the members of the State board. The question is of far more than local interest. Organized dentistry may be on trial up there, and the final decision may affect every dentist in the U. S.

Miss Marie C. Alkon, Portsmouth, N. H., has the distinction of being the first woman to complete the four-year course in dentistry at Tuffts college, from which she was graduated with high honors in June, winning a scholarship amounting to $1,000. She will spend a year at Forsythe, and then specialize in work for children.

Are you a "Flea?" Here's "How."

Twenty-six of 37 candidates before the Virginia state board have been licensed to practice in that State.

A woman, Dr. Ola de Sheffield, has been appointed member of the Texas State board. The other members are Dr. R. L. Rogers, of Amarillo, and Dr. G. P. Robertson, of San Antonio.

Tennessee State board, June 18, passed 29 applications for license, and granted passing grade to six juniors for so much of the work as they have covered. Of the 29, twenty were white. Ten states and as many colleges were represented by the applicants. The person-

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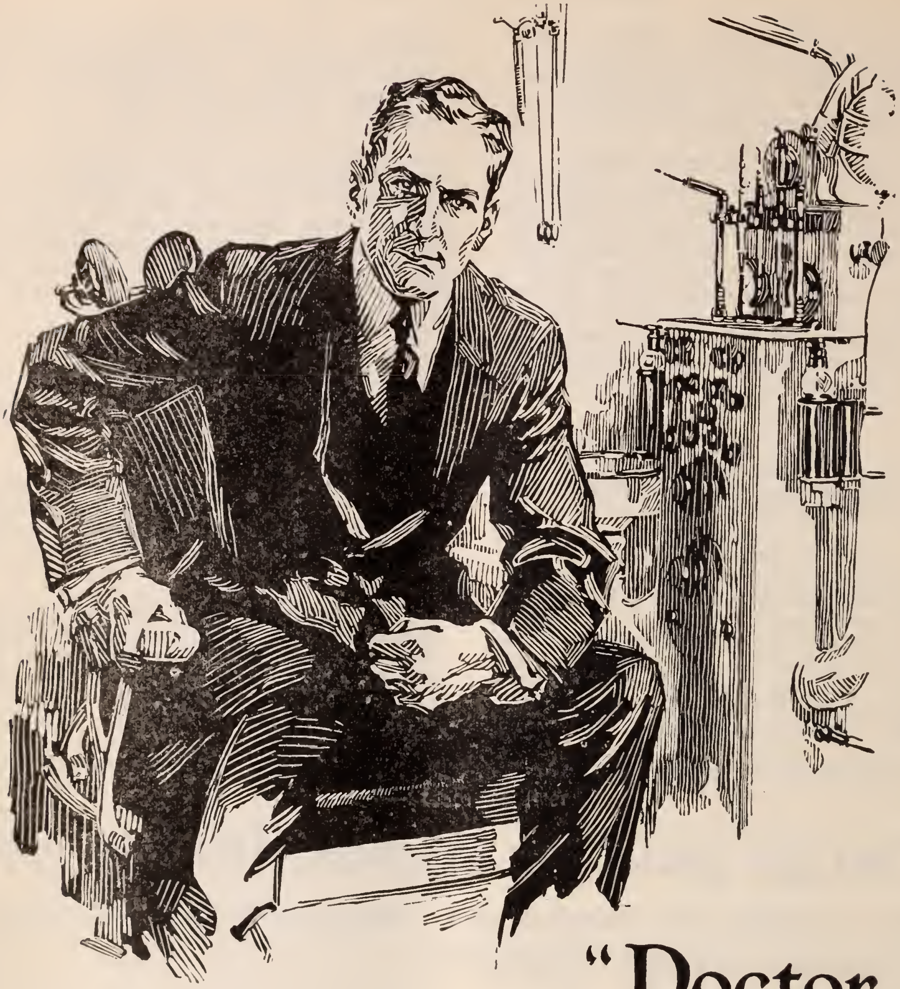

"Doctor, I want Teeth I can chew with!"

THAT is the expressed desire of the practical minded. The average man thinks of teeth in terms of mastication. He enjoys eating or not according to his ability to chew with comfort and thoroughness. To him, the influence of teeth on appearance is not dominant, as it is with so many women, but secondary.

You are faced with the necessity of providing artificial dentures capable of cutting, tearing, crushing and grinding food with the greatly-lessened force possible to exert against a membrane-covered, edentulous arch. Your problem is difficult—your patient's need is great. The problem was unsolved until the application of scientific knowledge evolved

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Prof. Gysi, of the University of Zurich, recognized that artificial molars supported by movable bases resting on sensitive membrane could not utilize the full force of the muscles of mastication which is used when natural teeth are embedded in bone. It was an engineering problem and Prof. Gysi saw the only solution lay in changing the surfaces of artificial teeth so that they could be forced through food with the amount of pressure which could be utilized—Trubyte posteriors were the result.

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nel of the Board remains: Dr. George L. Powers, Memphis, president; Dr. John A. Gholson, Clarksville, vice-president; Dr. F. W. Meacham, Chattanooga, secretary and treasurer;Dr. H. M. A. Smith, Knoxville; Dr. W. D. Ferrell, Nashville; Dr. H. K. Templeton, Covington, all of whom were present. Dr. Powers was elected representative of the state board on the national board of dental examiners and Dr. F. W. Meacham, alternate.

Dr. M. Ecker, New York, tells the "Medical Record," that by passing Nitrous Oxid over a mixture of equal parts of paraldehyde and anasthol, a very much improved anesthesia is produced, that eliminates the stage of excitation, doing away with the necessity of straps even for alcoholics, eliminating dreams and hallucinations, without nausea, lasting about two minutes after the mask is removed.

If you have a "Brophy" or an R. & R. gasoline laboratory outfit, and are finding any difficulty in using ordinary filling-station gasoline successfully and with entire satisfaction, write The Ransom & Randolph Co., Service Department, Toledo, Ohio, and learn how to overcome all of your troubles. Some very remarkable improvements have been made in the carburetion of low-grade gasoline.

A buzz-saw can do something besides buzz. A dentist of Columbia, S. C.. June 18, was sentenced to pay a fine of $1,000 and serve the government at hard labor in the Atlanta federal prison for 18 months for violations of the Harrison narcotic law. Better keep away from the business-end of that thing. An M. D. here in Toledo was sent to Atlanta last week under convinction and sentence on the same charge. Somehow, the courts seem to have lost their respect for diplomas and licenses. Even the wearing of a long black coat and the carrying of a medicine-case seems no longer to bring immunity.

Dr. F. C. Babcock, Kaukauna, Wis.. is president of the State board, and Dr. J. L. Bliss, Fond du Lac, is secretary.

Another "leak" of State board questions is alleged in Chicago. This time it is charged that copies of the questions were offered students for $25. It is said that they were "on the market" before official distribution had taken place. Well, well! Chicago always was a hustling sort of village.

Gov. Morgan, W. Va., has appointed Dr. R. M. Hite, of Marion county, and Dr. Homer Mannion, of Huntington, to be members of the State board of examiners, the latter to succeed Dr. H. H. Smallridge. The former was a re-appointment.

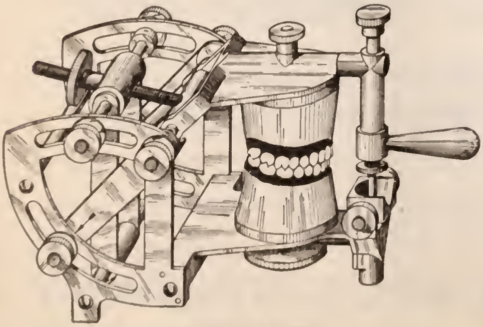
If you are having business troubles maybe I can help you. My left ear is wide open.

Britain Puts Curb on Amateur Dentists

London, June 18—England is becoming considerably aroused over its teeth, which are a stock subject for adverse comment by Americans here.

First, the Commons passed a bill making it possible for all unregistered dentists to register, thereby placing them on an equality with skilled men. Heretofore anyone could practice dentistry in England without education in the profession. The Commons Committee reported some time ago that they found butchers and steel drillers making a living fixing teeth. The only restriction was that they couldn't call themselves dentists, hence the predomination of "dental surgeons," "dentistry parlors," etc. By this bill all are put on a common level, but in the future, practitioners will have to stand examinations.

Sir Frank Colyer, one of the best known dentists in London, refuses to attribute the good American teeth to good dentists but to the fact that Americans keep their teeth clean.



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Another dental diploma mill has been unearthed in New York. This time the fee was $250 to $850, and buyers were advised not to try to practice in this country. South America was recommeneded as a promising field. The "faculty" is under arrest.

Dr. Dayton Dunbar Campbell conducted a denture prosthesis class at the Idaho State meeting at Boise, the week of June 29.

The Alabama state board has issued licenses to seven applicants who passed the recent examination.

Fifteen graduates were awarded licenses to practice in Arkansas by the State board July 2.

Wisconsin—State

Milwaukee, July 13—Dr. E. C. Oviatt Columbus, Wis., was elected president of the Wisconsin State dental society at its meeting Tuesday afternoon.

J. M. Donovan, Neenah, was chosen first vice-president, and E. N. Kapitan, Manitowoc, second vice-president. R. W. Huegel, Madison, was elected secretary, while Adolph Gropper, Milwaukee, was elected treasurer, and Roy Hopkinson, Milwaukee, librarian.

Idaho—State

Boise, June 30—Officers were elected for the year at the Wednesday meeting of the Idaho State dental association. B. H. Hudson, of Blackfoot, was elected president; F. W. Crichfield, of Boise, vice-president; M. J. Goode, of Filer, secretary; William Ludden, of St. Anthony, treasurer; H. C. Coleman, of Buhl, member of the executive council and E. B. Carpenter, of Boise, member of the board of censors.

North Carolina—State

Charlotte, June 29—W. M. Robey, of Charlotte, was tonight elevated to the presidency of the North Carolina Dental society, in annual convention here. Robert L. Horton, of Raleigh, was chosen as president elect. Other officers were elected as follows: John J. Battle, of Rocky Mount, vice-president; A. O. Lineberger, of Raleigh, secretary, and R. M. Morrow, treasurer.

For the first time in the history of the society a woman was given recognition as an officer, when Dr. Brownie Lee Lewis Crump, of Laurinburg, was elected essayist.

Ohio—Rehwinkel

Hillsboro, June 23—The following officers were elected today: C. H. Martin, Wilmington, president; C. W. Sodders, Washington C. H., first vice-president; R. S. Rogers, Hillsboro, second vice president; C. B. Yaple, Chillicothe, treasurer; S. E. Kay, Chillicothe, secretary.

Colorado—State

Colorado Springs, June 18—After five days of classroom clinics and sessions the Colorado State dental association will close its annual convention this evening.

W. A. DeBerry, of Colorado Springs, who for years has been a director of the association, was elected president of the organization for the coming year. Other officers elected were: A. C. Withers, of Denver, vice-president; H. W. Wilson, Denver, secretary, and William Smedley, Denver, treasurer.

South Carolina—State

Greenville, S. C., June 16—W. C. Hillhouse, of Barnwell, was elected president of the S. C. Dental Society yesterday, succeeding H. B. Hair, of Columbia. E. C. Dye, of Greenville, was re-elected corresponding secretary. The other officers were elected as follows: First vice-president, J. P. Glenn, Spartanburg; second vice-president, E. P. Hammond, Spartanburg; directing secretary, Frank Ferguson, Greenville; treasurer, A. H. Corley, Edgefield; editor-in-chief, J. P. Carlisle, Greenville. W. K. Walker, of Orangeburg, was elected to the board of dental examiners, succeeding W. K. Walker, of Orangeburg. The following, with terms expiring in 1924, were elected to the board of directors: Ed. Quattlebaum, Columbia;

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DENTAL GOLDS

H. B. Hair, Columbia; J. P. Carlisle, Greenville. The delegates and alternates to the national association meeting in Milwaukee were elected as follows: N. S. Lea, Charleston; Ed. Quattlebaum, Columbia; L. P. Dotterer, Charleston, and G. A. Milner, Aiken. Meeting at Georgetown in 1922.

Georgia—State

Macon, June 16—The Georgia State dental society at its meeting here today chose Augusta as its meeting place for 1922. S. R. Atkinson, Jr., of Atlanta, was re-elected treasurer and G. A. Mitchell, also of Atlanta, secretary.

A. P. Gordy, who was last year named president-elect, was formally installed as president, and N. A. Teague, of Augusta, was made president-elect.

As delegates to the National Dental Society convention to be held in Milwaukee, Wis., August 15-19, the following were chosen: N. G. Slaughter, of Athens, and DeLos Hill, of Atlanta. Alternates named were: H. H. Johnson, of Macon, and N. A. Teague, of Auguta.

Advanced Mechanical Dentistry

A new course in Advanced Mechanical Dentistry is announced by the West Side Y. M. C. A. Educational Director. Mr. Takanaka, a well-known mechanical dentist, has been secured to teach this course.

The post-graduate courses as outlined will take in carving of Wax Blocks to make one adept at carving cusps and crowns, also knowing the different inlay cavity preparations to be used as abutments for male and female attachments in removable bridge work. The different attachments will be used to cover the technic that is required in Chaye's System, Brown's System, Nesbett's Cast Clasps and Yorkian attachments. All the above systems will be taught with the Brown Maier Parallelometer. The advance work will be done with german silver to begin with and finished with gold. The technic of soldering Jackson's orthodontic appliances will also be taught with the above advanced work.

The regular course in mechanical dentistry will be continued. This work consists of making artificial dentures and restorations, such as plates, bridges, crowns and inlays, for which impressions have been taken from the patient's mouths by the dental surgeon.

By the courtesy of the American Protective Tariff League, New York, we are in receipt of an elaborate and useful document entitled "Wages in the United States and Foreign Countries," issued by the Committee on Ways and Means, House of Representatives, Washington. The document is based upon the testimony before the Ways and Means Committee during the recent hearings which was verified and amplified through official sources. It contains no argument but simply facts, which ought to be in the hands of every citizen. Write to your own Congressman and ask him for a copy of "Wages in the United States and Foreign Countries."

Mayo Clinic in Portsmouth Ohio

A clinical institution bearing the system used by the Mayo Brothers at their hospital in Rochester, Minn., will be located in Portsmouth, Ohio, under the immediate direction of a clinical director from the Mayo Hospital. It will be modern in every detail and with all the latest appliances and equipment known to medical science, and will be run in connection with the New Mercy hospital.

The clinical staff consists of twenty skilled practitioners. Dr. S. D. Ruggles, dentist and oral surgeon, of Portsmouth, is secretary of the Staff and Head of Departments of Oral Surgery and Focal Infection.

Annual Picnic

Toledo Dental Society, June 22, 1921

I'm particular about the date, because a record was set, and a number of near-records established. Let's hang it up as a target for future picnics to shoot at.

The record established was the best all-around outing the Toledo Society ever had—best in general good feeling, best dinner, best attendance, and finest weather. For the near-records see below.

The new President, Dr. Walter H. Hisey, hung up a nifty loving cup for golf contestants, and then won it himself on score. Refusing to accept it promptly and heartily, it was deservedly awarded to Dr. Robert H. Vollmayer, who was behind the leader only a point or two, Dr. Hisey carrying off the second prize. Dr. Walter Sargent, third prize.

In the driving contest, Dr. J. J. Welker won first prize and honors. Dr. W. J. Dierks captured first in approach contest, Dr. H. R. Francis first in putting contest.

Dr. H. R. Ryan, Monroe, Mich., carried the honors in the horse-shoe pitching contest out of the state.

Everybody won at the dinner contest at 1:30.

Then came the baseball game, in which everybody took a hand, either as players or gallery. Drs. L. L. Barber and H. C. Kuebler "chose-up" and ably captained the sides—from the sidelines. Penske and Harter acted as umpires, protected by every player on the side favored by the decisions. Score: Barber, 6; Kuebler, 5.

"Home-again blues" and stiff joints reported by some of the faithful. but it was a happy day for everybody, and thanks are due to the Outing Committee: W. W. Penske, chairman; W. J. Dierks, W. Seitz, W. H. Coleman, and Paul Kuebler.

Now let the '22 committee shoot its head off trying to do better.

DEATHS

At Pittsfield, Mass., July 7, Dr. Frank Warren Brandow, aged 68. Dr. Brandow was one of the few successful and famous inventors along lines foreign to dentistry, and known all over the scientific world for his work in improving the Lumiere method of autochrome color photography, by which the plates were dried and rendered permanent without loss of color. He was also the inventor of a successful automobile lock in general use. Electrical and ignition devices were his hobby, although he made miniature locomotives and aeroplanes just for the fun of it. Some of his play-work was so fine that it has been given permanent place in prominent museums.

At Atlantic City, July 13, Dr. George H. Lutz, aged 61. He practiced in Germantown for many years.

At Ithica, N. Y., July 11, Dr. George W. Hoysradt, aged 86.

At Promise City, Iowa, July 2, Dr. Morris E. Spence, aged 34.

At Brooklyn, N. Y., July 3, Dr. Joseph S. Carmichael was overcome by gas from a leaking pipe, and died from its effects before aid could reach him.

At Newburgh, N. Y., Dr. W. A. Wood ended his ill health by shooting himself in the temple.

At Louisville, Ky., June 18, Dr. Lawrence R. Marquette, of heart disease while swimming.

At New York City, June 18, Dr. August L. Peters, aged 63.

At Seattle, Wash., June 20, Dr. Clayton A. Follett, 57.

At Boonville, Ind., June 14, Dr. T. J. LaMar, aged 73.

Dr. T. H. Whiteside Dies at Age of 71

Youngstown, O., July 13th, 1921—Dr. Thomas H. Whiteside, 71, a well-known dentist and highly regarded resident of Youngstown, died at his home, Midlothian Blvd., at 12:30 P. M. Wednesday following several weeks' illness.

Since 1881 Dr. Whiteside had been practicing dentistry in Youngstown and was one of the leading members of his profession. He had offices in W. Wood Street for many years but for some time he had rooms at 512-514 Mahoning bank.

Born in Harmonsburg, Pa., August 29, 1849, son of the late James and Mary Martha Nelson Whiteside, he lived there during his boyhood. He received his early education in the Harmonsburg public schools and continued his studies in the Meadville high school.

In 1869 he took up the study of dentistry in Meadville, Pa., and was graduated from the Pennsylvania College of Dentistry in Philadelphia in 1876. He took up the practice of his profession in Jamestown, Pa., coming to Youngstown from there in 1881.

In 1872 Dr. Whiteside was married to Miss Flora Grier, who survives. He also leaves four children, James G., William H., Frank P. Whiteside and Mrs. Venice J. Lamb, all of Youngstown.

New Mexico—State

The fourteenth annual meeting of the New Mexico State Dental Society convened at Albuquerque, the metropolis and convention city of the state, June 20—24. The meeting was devoted almost entirely to post-graduate work, conducted by Dr. C. J. Hamilton, of Denver, Colorado, on full dentures, and Dr. Howard R. Raper, of Indianapolis on X-ray technic, radiography and oral hygiene. The courses were practical and ably given, and each dentist was in personal touch with each step of the course.

A State Legislative Committee was appointed to secure state legislation for oral hygiene in the public schools. The society voted in favor of interstate reciprocity.

On the 22nd, the dentists and their wives motored eighteen miles to the Sandis Mountains, and had chicken dinner. On the 23rd, the annual banquet was held at the Country Club. The local committee of women headed by Mrs. R. F. Pettit, entertained the visiting dentists' wives and aided in making the entertainment part of the program one long to be remembered with pleasure.

Invitations were extended to the society to meet next year in the cities of Albuquerque and Gallup. Albuquerque was accepted and a vote of thanks given to Gallup.

The following officers were elected for the ensuing year: President, C. H. Woolgar, Magdalena; first vice-president, C. W. Hoover, Dawson; second vice-president, H. S. Murdock, Springer; secretary and treasurer, D. P. Norting, Albuquerque.

Chinese Wisdom

If you bow at all, bow low.

A man thinks he knows—but a woman knows better.

Free sitters at the play always grumble most.

I have seen not one who loves virtue as he loves beauty.

Only imbeciles want credit for the achievements of their ancestors.

The faults which a man condemns out of office he commits when in.

No image-maker worships the gods. He knows what they are made of.

One more good man on earth is better than an extra angel in heaven.

It is not the wine which makes a man drunk—it is the man himself.

If you suspect a man, don't employ him—if you employ him, don't suspect him.—The Independent (New York.)

What Is Money?

A student of economics in one of our large universities was instructed by one professor that the term "money" meant a medium of exchange, and included gold, silver, paper currency, etc. Another professor in the same college told him money was a medium of exchange "universally accepted," hence the term applied only to gold. After careful consideration the student decided for himself that money was anything that you could get your neighbors to accept as value received.

Money for local circulation is made of a variety materials. In Germany today at least five metals, gold, silver, iron, zinc and aluminum, are used for coins, to say nothing of paper. In another European country ordinary postage stamps, protected with a round celluliod covering pass for currency. Every one knows that "wampum" was once the currency of the youthful American colonists, who later on employed tobacco for the same purpose, and the cowrie shell of parts of Africa is equally familiar. In certain Pacific islands stones are used as money and the man who has the largest collection of round boulders in his front yard is the local Rockefeller. Incidently the man whose wealth is thus indicated is in no need of a safe deposit box or bank for his valuables—they are too heavy to carry off.

Gold From Waste

Yonder is a large pulping plant which prepares tomatoes for market. Behind it is a great heap of garbage—skins and seeds. An unpleasant sight you say. Now look again. Science touched that heap and literally changed it into gold. Instead of that great heap of 2,000 tons of seed going to waste, carloads of salad oil and beef will go to market. The fact exists but the process must be imagined. Chemists of the Department of Agriculture know that if anything appears as waste it is because we have not yet found its use. They gave serious study to a little seed no bigger han a pinhead and found it was 20% edible oil. Then analyzing the residuum they found it 37% protein. Making a quantity into cakes it was fed to a white-faced Hereford who ate it greedily and turned it into the choicest steak that man ever ate. Because of this discovery there will be no more garbage heaps around the pulping mills of the future. Much of our olive oil should be cousin to the bottle of catsup, and we should hear the up-to-date purveyor of meat ask "will you have the ordinary steak or the tomato flavored"? And the money invested in canning factories should show a correspondingly better return because of extracting gold from its waste.

A Keen Trader

A certain trader on the floor of the Cotton Exchange had been rather successful in his operations. He had built up a fair-sized fortune, and his friends were wondering how he would invest his profits.

"Well, Jones," said a friend, "what little 'baby' on the Big Board are you going to corner now?"

Jones grinned, and said: "No flier for me."

"Well, what are you going to do with your money?" asked his friend.

"I have already invested it," replied Jones. "I put every dollar I made in cotton into Liberty Bonds. I am looking to the future. Think of Government Liberty Bonds selling at such prices. Think of the securities of this great country touching such low levels. Consider the economic and financial position of the U. S.—the banking resources, the bumper crops, etc. Liberties for mine."

Classified Advertisements under this heading, $2.00 each for 60 words or less; additional space, 2 cents per word, single insertion; three insertions or more special rate on application.

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REGULAR CONTRIBUTIONS

THE DENTAL SUMMARY
THE MAGAZINE THAT HELPS

Vol. XLI September, 1921 No. 9

THE ESSENTIALS FOR DENTAL ROENTGENOGRAPHIC INTERPRETATIONS*

BY WILLIAM A. LURIE, M.D., NEW ORLEANS, LA.

I NOTE THAT I AM on the program to cover the subject of "Roentgenology." The subject is too extensive to cover in the time allowed me, but I will attempt to give you some indication of the way X-ray determinations or interpretations can be made with respect to the elemental physics, which is the underlying principle of light penetration and light portrayal of parts. I may perhaps be able to draw to your attention some things that are common, simple, that you may have overlooked, and to show you how you might apply these simple principles to the subject of roentgenology, perhaps to your assistance. That will be in the main the topic of my morning lecture. During the afternoon I hope to show you some of the outstanding features in bone structure about the mouth and jaws, and the relation of these changes of structure, either through an embryonic defect or through a pathological condition, to show you the difference that they will portray on the X-ray picture, so as to enable you to make the proper diagnosis.

This morning I will take up the matter of interpretation of the picture as an entity. Before we can begin to understand one another, it is necessary to understand the terminology that one is going to use. I believe that the terminology in roentgenology, particularly dental roentgenology, today is hopelessly confused, and I believe that one of the most progressive steps, one of the greatest advances, will be made in determining on a more simple and a more definite terminology. Therefore I shall discusss that feature first.

It is common thought that an X-ray picture is a shadow picture. The majority of people whom I meet and ask to explain or give me an idea of what a roentgenogram is, will tell me that it is a shadow picture. That of course is true to a great extent, but it is insufficient in the explanation of what a roentgenogram is. A roentgenogram is more than a shadow picture. We will shortly have the opportunity of reviewing several real true shadow pictures of models of teeth, and you will distinctly note the difference between all shadow pictures and the shadow picture that makes a roentgenogram.

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* Stenographic report of a lecture delivered before the West Virginia State Dental Society, April, 1921.

The roentgenogram is such by virtue of the penetration of light. It is not the picture that is made by the obstruction of light. It is made by virtue of a light force that penetrates masses of various densities, and the remaining force of that light causes a registration on a sensitive film. Therefore a roentgenogram is a registration of the penetration of light. If the light penetrates equally or is obstructed equally, your shadow is even and flat, the same as you get in an ordinary shadow, and the only features that are outlined in it are those which outline the extent of the body which is obstructing the light. You know this is not true in an X-ray picture, because a tooth will obstruct the light, and therefore, if it were simply a shadow picture, that picture would be simply the result of obstruction of light and the outline of the tooth as it is in reality.

But we have more than the outline of a tooth in an X-ray picture. We have the outline of the pulp chamber; we have the outline and delineation of the alveolar process; we have the outline and extent of any filling that happens to be put into that tooth, and we also have the outline of the soft tissues, that is, the gingival tissues that surround a tooth. Each one of these delineations means the obstruction of light, or means an obstruction to the force of penetration to the extent registered. The film is in black and white, and is the result of the oxidation of silver salts and their precipitation through development. That part of the film which indicates the outline of metallic bodies comes through very white, and is the indication of a lack of penetration of light. There has been a lack of oxidation and a lack of light-force activating the film. Therefore, during the process of development and the process of reduction or fixing the film, the salts that were not reduced were eaten off, and that film remains as a very white and transparent portion. That portion where there was nothing to obstruct the penetration of light shows the full effect of such light-waves and light-penetration, and is a dark portion of the film. From these two extremes in dental roentgenology we have all shades of white and black mixtures and all shades and densities of gray.

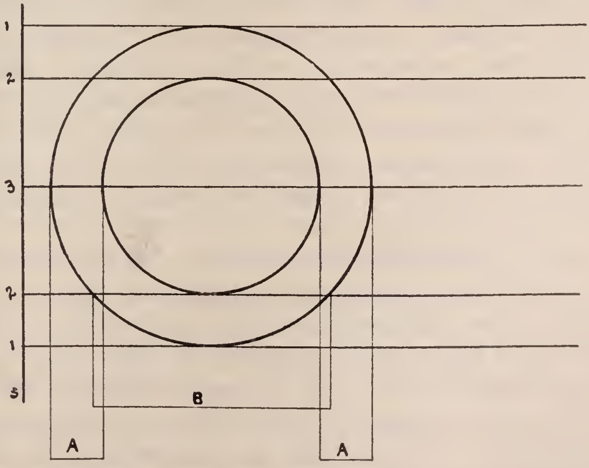
Therefore I should like to suggest today as a name which is more descriptive of our forces and of what the result is, the name of "Penetogram" for the dental or any X-ray film, the X-ray picture being a penetogram, or more distinctly a registration of light penetration. The obsolete and old-used terms of "skiagraph" and "skiagram" I believe are fast fading away. The X-ray picture does not mean much as to the descriptive force unless one understands the term "X-ray" thoroughly. The term "roentgenogram" is rather a hard one to remember, and is again non-descriptive. The term "radiogram" at the present day is likely to be confused with wireless telegraphy because of the similarity. So that I believe the time is opportune for a better term, and therefore I make the suggestion of the term " Penetogram " from the word "penetration," meaning a registration of penetration of light.

Why does the light from an X-ray tube penetrate the tissues differently than ordinary solar light? To determine it would be best perhaps to glance over a chart of wave lengths of the different colors of the spectrum. In the table below you will find a chart with the outline of the various wave lengths of the various colors of the solar spectrum.

		Color of rays				Wave lengths		
		Tri-ultra-red	Solar light rays			Longer than	18	microns*
Heat rays including electricity.		Bi-ultra-red					18	mic.
		Ultra-red					8	mic.
	Optical or visible rays.	Red		Chemically active rays.			0.71	mic.
		Orange					0.66	mic.
		Yellow					0.62	mic.
		Green					0.53	mic.
		Blue			Finse light rays		0.48	mic.
		Indigo					0.43	mic.
		Violet					0.38	mic.
		Ultra-Violet					0.21	mic.
		Bi-ultra-violet					0.10	mic.
		Tri-ultra-violet					0.014	mic.
		Rays of radium and Roentgenography				Shorter than	0.014	mic.

* A mircon is equal to one millionth of a meter or one twenty-five thousand four hundredth of an inch in length.

Note: The shorter the wave length, the more rapid is the wave.



Illustrating that portion of a tube or ring through which the greatest resistance to penetration is registered.

The unit of measurement of a wave length is a micron. The length of a micron is given as one-millionth of a meter, and in terms of microns we have the different wave lengths given here. You will note that those waves that have a long wave length, or over .21 of a micron, are noticeably different in their effect therapeutically, or their effect in all directions, over those which have a shorter wave length. Above .21 of a micron we have those colors up to and including ultra-violet. Below that we have the bi-ultra-violet and the tri-ultra-violet, the rays of radium and the rays of roentgenology. Those are specifically given as having a wave length of .014 of a micron. It appears that the greatest feature of penetration of light is perhaps inherent in the shortness of the wave length, to which class X-ray or roentgenology belongs.

To apply this principle to X-ray, we find in a given length of distance, if that were an item of distance, one wave length would consume a certain distance, two wave lengths would divide it, and we consider that down to any length that we want. We can count any number within that distance. Likewise, if that distance has a time element of one second, it means that in the time of one second a wave length of one-half of that distance will register twice as often as the wave length that travels that distance in one, and the wave length that travels it in one-fourteenth of it will register fourteen times.

If a body of some resistance to this wave penetration is interposed between the pole from which these rays emanate and the surface on which it falls as a shadow or as a registration of its result, if this body has half the resistance necessary for penetration, the long wave will not penetrate it and will not register because of the element of time, sufficient rays not having gone through. This is particularly true where one notes the work in heliotherapy or in sunlight therapy. It is perfectly possible with a long exposure under a heliotherapeutic lamp, to get a rather indefinite but still traceable registration of the penetration of light through the hand or the body, but such exposures must be timed in hours rather than in seconds as we time them now with the X-ray. The rays of light in the heliotherapy apparatus are long waves. Therefore the body that obstructs them does not permit them to penetrate in ratio to their wave length. Exciting an X-ray tube over that same area for perhaps two or three seconds will register a greater amount of penetration, being an indication that more waves had penetrated through it because of the greater force behind them. Therefore, our picture is a registration of all the rays that have penetrated through, or the force with which they have penetrated through a given definite object or area.

I regret that I have not illustrations to show this completely. I have not been able to have them properly designed, but this is the result of work along comparative lines, that of roentgenography and that of heliotherapy. I submit this as a support for the definition that I gave you a few moments ago of a roentgenogram being a registration of the penetration of light.

The word "interpretation" means the translating of, or the interpreting of and explaining. It is necessary, therefore, to take your roentgenogram or penetogram and explain what those shadows mean, and it is the correlating of those shadow pictures or registrations of penetrations with your local anatomy as you know it that makes your ultimate diagnosis possible.

You should not make a diagnosis of a dental X-ray film by saying "There is an area that is abscessed because it is black," but you should know what that black means. That black may mean anything from an acute destruction without pus formation, to a complete destruction of bone in its entirety, with the substitution of perhaps some granulation tissue, or a cystic formation, and it is the explanation of that process that is really and truly an interpretation. But you interpret it in value and in terms of penetration.

What governs penetration? Penetration is governed by the resistance that the body interposed or being shadowed bears to the X-ray or the roentgen-ray. Given a section of the jaw which we are to picture, we find that there are distinctly different bodies, distinctly different processes through which the light must pass. There are the soft tissues of the cheek and the soft tissues of the gingiva; there is then next the alveolar process which is a bony structure, a tooth, and in dentistry the filling material that is used for root-canal work or that is used for replacements. These substances can be classed according to their shadow formation, and their shadow formation depends upon their penetrability to X-ray light, and that penetrability depends upon one thing principally, and that is the atomic weight of the body that that ray of light is penetrating.

It has been possible to classify those shadows into three great classes or grades. Grade 1 is that part of that tissue of the body which is free from mineral salts, that is, soft tissue. There is a distinct characteristic to that shadow. That shadow is almost a black, and is the hardest to differentiate from that portion of the shadow where there is nothing to obstruct the penetration of X-rays. It is smooth; it does not show any graining, any texture; it does not show any circulating of blood; it does not show any fiber. It is therefore a smooth, dark shadow, indicative of greater penetration of light or a greater registration of light force.

Grade 2 shadow is that shadow which indicates bone. There is a great division in the bone shadow of the jaws which represents alveolar tissue and that shadow which represents the denser bone. You will note, if you will recall to your minds any of your X-ray pictures, that there is a distinct difference, and you can, without doubt, determine the difference between alveolar tissue and bone or tooth structure on any roentgenogram that you care to view. The characteristics of these two grades of shadow, or these two sub-grades of shadow, are these: in the alveolar tissue we find the trabeculæ of bone which form the walls of the haversian, and that portion of the picture which includes that area is irregular, mottled, honeycombed, spongelike, in contradistinction to the dense appearance of the obstruction, the solid dense obstruction due to dense bone or tooth structure as we see it. In tooth structure, where the substance is more compact, we do not get the appearance of the real shadow that we do in the alveolar process; we do not see any tubuli in the bone; we see a more compact mass.

Grade 3 shadow is that which includes all foreign matter. Any foreign matter that is not the texture of bone can be recognized, provided it has a similar density. If it has a greater density, it is usually of greater density than that of compact bone.

There is, as I have stated, the governing of these classifications by the atomic weight and specific gravity of bodies, and notably we have in these Grade 1 and Grade 2 divisions this difference: Grade 1 is soft tissue without any, or with very little mineral salt in it; whereas Grade 2, being bone, is that portion of the body that has a greater amount of mineral salt. The difference in the amount of mineral salts in alveolar tissue over dense bone is that difference due to its compactness. Alveolar tissue will not have the specific gravity or atomic weight of dense bone. Therefore the alveolar tissue has not as dense and as deep a shadow, and has not the registration of that lack of penetration that we see in the denser bone.

Foreign matter usually is that which is introduced dentally by operative procedure, either as root-canal filling, bridgework, etc., and there again, depending upon its specific gravity, it shows a variance from the resistance offered by metals down to the resistance that is offered by the various cements. But the characteristic of this shadow of the third grade is that it is smooth, that it also is a shadow without any particular design within it. This, therefore, is the great division into which the shadows can be classed.

Therefore, if we take the specific gravity of soft tissue, or Grade 1, as an index of one, our bone density or Grade 2 shadow may have an index of one and one-half for aveolar tissue, which has the specific gravity for the lighter mineral salts in the body, and the dense bone may have an index of two and one-half, which is more nearly the specific gravity of the heavier chalks and calcium salts which enter into bone formation. Foreign material which is introduced, with the exception of some of the cement, all have an atomic weight or specific gravity well over five, so that we have here a distinct reason and a distinct indication of why we get a variation in the shadows in the roentgenogram. In the roentgenographic picture you will see that penetration is governed by the size of the mass that is being penetrated. But given a mass of steel, for instance—and this is an illustration I have used very often, I believe it is commercially used in testing steel for flaws, being tested with the X-ray;– how is the determination of a flaw made? That block of steel has a certain atomic weight, a certain specific gravity, and to be perfect that atomic weight should be equal throughout the entire extent of the steel. If in the pouring of that piece of steel an air bubble should develop, the penetration through the plane of that air bubble, through that given block of steel, is different, so that if this has a unit of resistance for that distance of, let us say, one, and, to make it equal, we say that it is nineteen inches across, and this air bubble occupies a space of perhaps three inches, the resistance through there is just sixteen instead of nineteen, and on the film at the other end, or on the fluoroscopic screen, that is blocked out with the outline of that bubble being distinct and of lighter appearance on the fluoroscope, or a darker appearance, or a registration of greater penetration on your film.

Then bringing this interpretation to the point in question, to dental roentgenography, we will consider soft gingival tissue, alveolar tissue and denser bone representing the tooth structure. Our film is placed in a certain position, the light comes in from another position; we have a definite amount of dense bone to go through; we have a definite amount of soft tissue to go through, and we have a definite amount of alveolar tissue to go through. Each one of these divisions of tissue has its own amount of resistance, and because of the resistance as pictured we grade our shadow. Anatomically we know that perhaps no dense bone exists, above the line I have indicated, except as tooth structure; that the distance between there and the apex of the tooth is consumed or occupied by alveolar tissue. Having pictured alveolar tissue often enough to know its characteristics, and having diagnosed or determined it as Grade 2-A shadow we know its anatomic extent, and if we should see about the apex of a tooth that the alveolar shadow is missing, and we have substituted there a shadow which approaches Grade 1 without as much alveolar texture or grain, and a greater amount of penetration, that might determine that there has been some bone destruction there. That does not necessarily mean pus. Any one who makes such a diagnosis is making it fallaciously. That is only an indication of greater penetration of light, and greater penetration of light means the destruction of bone and the deposit of debris which permits of a greater penetration of light. If that process be in the tooth structure itself as caries, it will be just as visible as it is about the apex of the tooth, no matter at what position that carious point may be found. It may be found to the buccal side or it may be found to the lingual side or in the interproximal space, but if it is there it is going to register, and you are going to determine it and describe it, not because you know it is decay, not because you know such things are decay, but because you know that there is a lack of resistance to penetration at that point and a greater penetration of light through that tooth than there should be in that tooth without decay.

We have within the tooth the pulp chamber and the root canal. In a properly-taken, properly-focused dental picture, those structures always become visible. If the roentgenogram were a shadowgram or a shadow picture, that would not be true, but because of its being a registration of penetration of light, those rays which go through level

No. 1, as illustrated in the diagram, diagramatically representing a tooth and pulp chamber, or level No. 2 or No. 3, in comparison, each find a difference in resistance. Along line No. 2 there is the greatest resistance to penetration, greater than along line No. 3. If the pulp chamber be within the inner circle, and as it is tissue without mineral deposit, its extent, if measured along line No. 3 is less than indicated by the line B which is the extent of bone resistance met with by the rays along line No. 2. The combined bone resistance on line No. 3, as shown, is A plus A, whereas along line No. 2 it is equal to B, which is greater than A and A.

This difference of resistance is sufficient of being pictured, and when pictured on a dental roentgenogram, as explained, pictures the extent of the pulp chamber.

THE CAST CLASP*

BY A. ALFRED NELSON, D.D.S., DETROIT, MICH.

IN A NUMBER OF RECENT ARTICLES on partial denture and removable bridge-work, there appear numerous criticisms relative to the cast clasp and especially to the interior surface of the clasp; *i.e.*, that surface in contact with the teeth.

It seems to me that this criticism is all of a constructive nature, the object being not to condemn the clasp but to better the technic so that the man of average ability may do with reasonable accuracy and assurance of success, that which the most expert do. For this reason, I am adding this subject of "Clasps" to the series of articles on Partial Denture Construction, in the hope that what I have developed in the way of technic will be of assistance to others.

The clasp, whether wrought or cast, is, was and probably always will be the most universally-used medium for the retention of partial dentures. This being the case it is well to consider the parallelism that can be drawn between inlays and clasps, relative to construction. Some sage once remarked that "there were inlays in some teeth and islands of gold in seas of cement, in worlds of teeth." This aptly expresses the distinction between clasps; and for this reason if for no other, it is well to consider the modes of construction in vogue today with a view to clarifying the matter.

Clasps are divided into two classes, namely, wrought and cast. For universal application I do not favor the wrought clasp, yet there are indications and conditions under which no other type of clasp should be used or made. For extremely bell-shaped teeth or malformed teeth, wrought clasps only should be used and Dr. Cummer's (Toronto) technic followed intelligently in the construction of same. This technic can be found in back numbers of THE DENTAL SUMMARY and is well worth the time spent in reviewing it.

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*The fifth of a series of articles on Partial Denture Construction being written exclusively for THE DENTAL SUMMARY.

For universal application the cast clasp, as made possible by the metallurgical investigations and developments of Dr. L. J. Weinstein, undoubtedly offers greater possibilities than the wrought clasp for the retention of partial dentures. The one great objection and criticism to this mode of construction is the roughness of the interior; *i.e.*, that surface in contact with the enamel of the tooth, which is not due so much to poor technic in casting as it is to a poor model. My reasons for this contention are that it is well known that the majority of men cast direct to the model. If the surface of the model is rough, it necessarily follows that a casting made over this model also will be rough. This roughness often is caused by applying the wax pattern to model, or in separating the model from impression; or it may be due to carelessness in handling, etc. For this reason I have discontinued the use of investment materials for pouring the impression, and use artificial stone for this purpose altogether. My best results have been obtained with Healey's white artificial stone. The advantage of the stone model is that its surface is not marred by handling, waxing or separating from the impression. This stone model can be invested with the wax pattern and by using the boiling-out process of removing the wax pattern, no danger of recalcining the stone is encountered, because the heat required to dissipate the film of wax remaining after boiling is very slight and below the temperature at which the stone recalcines.

The complete technic is as follows: individual "self-separating" plaster impressions of the teeth to be clasped are made in the "Roach Split Trays" for the purpose. Sectional compound impressions can be taken in these trays also, and if properly taken with thorough chilling of the compound, are much more easily assembled. The impressions are then dipped in or coated with Kerr's isolating and filler solution and allowed to dry. They are then soaked for fifteen minutes in cold water and poured in artificial stone. When set, the models are readily separated from the plaster impressions by placing in a pan of water and bringing to a boil. The models are allowed to dry and the desired shape wax pattern of the clasp made on the model by using 22-gauge Kerr's casting wax. The wax pattern is then carefully smoothed and wax sprue wires of 16- or 18-gauge attached. The model is then soaked in water and invested in a cast-clasp investment or Kerr's snow white plaster. Having invested stone model in a high-plaster content investment, the boiling-out instead of the burning-out process of wax elimination must be employed.

After the investment has set from thirty to forty-five minutes (preferably one hour), the crucible former is removed and the mold or casting ring laid on its side in a pan of boiling water and kept there for at least five minutes until it is evident that the wax has come out. There should be sufficient water in the pan so that the mold is well submerged and the water must not only be boiling when the operation is started, but must be kept boiling. To raise the temperature of the water for this purpose, add a small quantity of salt or sulphuric acid. The boiling process removes the entire pattern with the exception of a slight film of wax which adheres to the walls of the pattern chamber and which is decarbonized upon drying. As there is practically no wax present in the mold, the drying process may be done at a lower temperature than usually is the case. In fact, it must be done at a low temperature, as the investment containing a high percentage of plaster must not be subjected to an excessive temperature. Four hundred degrees F. for a period of thirty-five to forty-five minutes is sufficient. This method of removing the wax offers great possibilities and I do not hesitate to recommend it for inlay and other small castings as well as cast clasps. I have used it for a long time in large castings but it was not until Dr. Weinstein brought it to my attention as a factor in small castings that I really appreciated its merit. I have obtained better results with this method than I have with any other and I have tried a good many of them. When the mold has been heated for the stated period at the proper temperature, it is immediately placed on the machine and the pattern cast of the desired cast-clasp material.

I think a word of caution at this time is not amiss relative to cast-clasp alloys. These alloys in the cast form are rigid rather than resilient, and therefore the same degree of springiness must not be expected from cast clasps as from wrought clasps. In those cases where the clasps are to be forced open to spring over bell-shaped teeth they should be broad and thin rather than thick and narrow.

After casting, allow the mold to cool down until it is cool enough to handle. This tempers the metal and imparts a marked degree of elasticity to it, in contradistinction to rapidly plunging the hot mold, due to absorption of heat in melting the alloy, into cold water.

I have been using for a number of years an alloy for casting clasps which has given considerable satisfaction. However, I have been criticised by metallurgists for advocating this alloy. They state that it crystallizes very quickly and will not stand up in the mouth. This has not been my experience.

I wish some one with a knowledge of metallurgy and possessing the necessary equipment would investigate this and give the results to the profession. The alloy to which I have reference is Vanadium Gold manufactured by Henry Schweitzer, of New York City. This alloy has a minimum co-efficient of expansion and contraction and is intended for casting saddles, dentures, splints, etc. But I have used it for cast clasps and have found it admirable for this purpose, possessing considerable resiliency and still sufficient rigidity for thin clasps. In fact, in my hands, it closely rivals the wrought clasp.

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PARTIAL DENTURE CONSTRUCTION*

BY P. C. LOWERY, D.D.S., DETROIT, MICH.

THE CONSTRUCTION of partial dentures is one of the oldest branches of our science, yet it ever has been attended with more or less uncertainty as to whether the result would be satisfactory to either the patient or the practitioner. Generations of effort have failed to place this particular phase of dentistry upon an absolutely scientific basis.

It is not the object of this paper to attempt to cover in a broad way, the whole field of partial denture construction; the intention is to confine this discussion to the fundamental principles.

It is considered good practice to systematize all cases, as the best results can be obtained only when they are handled in a methodical manner.

The successful completion of a partial denture is dependent upon a thorough knowledge of the underlying principles of full denture construction, particularly those relating to the cause and effect of tissue changes.

The first step in the construction of a partial restoration is a thorough visual and digital examination of the mouth, noting the stability of the teeth *in situ*, and the tissue condition in general, paying particular attention to that portion upon which the restoration is to rest. The teeth then should be thoroughly prophylaxed. In passing, just a word of caution: do not arrive at a hasty negative conclusion, as the teeth and gums may appear in a much better condition at the second sitting.

The success of the denture depends upon securing the best foundation possible in each particular case, so it is vital to make every effort to have the underlying structures of the mucosa in as nearly a normal condition as possible, as they are to carry the major portion of the stress of mastication. For this reason, radiographs of the edentulous spaces are as important as those of the abutment teeth. Inasmuch as our aim is to safeguard the patient's present and future health, neither importunities nor favorable ocular evidence should influence us to save this or that tooth, thus neglecting the use of the X-ray, thereby, possibly leaving a hidden cyst, which, later may be the cause of partial or complete failure of a well-designed and executed partial denture. Permit me to remind you that, if surgical interference or alveolectomy is successfully used in correcting abnormalities, in securing stability for full dentures, it is equally important in preparing for the proper reception of a partial denture.

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*Read before the Michigan State Dental Society, Detroit, Mich.

It is an old and true saying that, "A man without a purpose is like a ship without a rudder." It is one aim of this paper to emphasize the necessity of vision and a preconceived mental picture of the completed case. There is no better means to this end than preparing study models and mounting them on an anatomical articulator. They enable us to determine with some degree of accuracy, the stress, method of retention, whether to open the bite and how to avoid excessive wear of the remaining natural teeth. It also shows the necessity of surgical interference and numerous other precautions. In studying these models, we should take into consideration the function of the particular denture.

A substantial partial denture, like a scientifically-constructed building, requires in advance a complete set of specifications. Like the building, it stands or falls by the correctness of the blue print.

Abutments are within the scope of this subject and I shall refer to them as they carry the attachments and the minor portion of the stress.

Speaking of abutments brings us to the disputed point of vital or non-vital teeth. This, at the present time, is an open question. Some practitioners condemn the pulpless tooth; others claim to retain it successfully. Until the stigma is removed from the non-vital tooth, we should continue to direct our ingenuity toward perfecting removable dentures, using vital attachments. Personally, I am a firm believer in the preservation of the dental pulp, and in this class of work I use live teeth for attachments, in so far as possible. This, in my opinion, is a strong point in favor of clasp dentures.

Retaining devices or forces are divided into three general classes: the first is one in which the denture is held in position by means of adhesion and clasps; the second class consists of special interlocking devices such as the Roach, Bishoff-Otrich, Gilmore, ring and stud, Yirikian, Chayes and various other similar attachments. In each case these connect with a fixed element attached directly or indirectly to the teeth, through the means of crowns, inlays, etc. All of these devices require the mutilation of tooth structure, and in some cases necessitate the devitalization of the teeth for firm attachment. Too many new appliances of this nature, through the enthusiasm of their sponsors, find their way to the profession in an undeveloped state. This is detrimental to the advancement of partial denture construction. The third class is that of indirect retention. It is an auxiliary used with either or both of the above classes. It is constructed of clasp wire and used for the purpose of balancing bilateral dentures. I prefer the first or simple retention, that of the clasp—either cast or formed, because it eliminates the necessity of mutilating the tooth structure or devitalizing the pulp; also, it allows the greatest ease of impression taking for rebasing dentures which is so necessary to the life and success of cases where the substructure receives the major portion of the stress of mastication. This form of mechanical stabilizer has come into its own very strongly during the past few years.

In some cases the wrought clasp has advantages over the cast clasp. The objection has been raised that too much time is required to properly make the well-formed clasp. Time is not the vital element; we should not take into consideration speed of production, when efficiency of function is at stake. The clasp denture accomplishes in a simple manner, what the second group previously mentioned is trying to accomplish in a complicated way.

Partial dentures as we know them today are more or less of a temporary procedure. To make them more permanent, careful attention should be given to rebasing, so that the mucosa and substructures always carry a portion of the strain. When the abutment teeth receive the greater stress, due to the negligence of rebasing, the partial denture becomes a removable bridge, and as this, fails.

Plaster of Paris gives us an accurate impression which is absolutely essential for the construction of the metal frame work. From this impression we should follow the usual procedure of bringing the case to completion, with the exception, that in vulcanizing we should use on the model a sheet tin or lead base of approximately 22 gauge. The removal of the sheet tin or lead base after vulcanizing, provides a freeway for the use of compound in taking an impression of the mucosa and the underlying structures. In taking his impression the usual procedure of rebasing a denture should be employed. Great care however, should be exercised in placing the partially completed denture carrying the compound in the mouth,in the same way that you propose to insert the finished denture. Carry the denture three quarters of the way to position, and then have the patient close and drive it to place. Hold it in position and thoroughly chill. In all mandibular impressions instruct the patient to swallow and suck just as soon as the mandible has been firmly closed; in taking maxillary impressions the patient should refrain from swallowing if it is a palatal bar case. Remove the impression from the mouth in the same way you propose to remove the finished denture; the side having the least undercut should be removed first. All impressions for partial dentures where the teeth are to be supplied in the bicuspid and molar regions should be taken under the individual's normal biting stress.

A denture can be no better than the working model upon which it is made; therefore, it is very important indeed, that we obtain an accurate cast and one which will best withstand the effect of pressure, heat and moisture during the period of vulcanization.

The selection and arrangement of the teeth is of prime importance. When the partial restoration includes the four or six anterior teeth, especially the maxillary teeth, they should be selected according to the typal system, so that they will be in harmony with the general outline, form and proportion of the face, and should be arranged to preserve the characteristic expression of the patient.

If any of the anterior teeth are left intact, we must resort to imitative art and replace the lost teeth with forms similar to those remaining in the mouth. In order to produce a pleasing effect in a restoration, often it is necessary to resort to grinding and staining of the teeth and the use of gum-pink porcelain to restore the continuity of the gum line.

The posterior teeth should be so arranged that when stress is applied to the ridge it will not have a tendency to dislodge the denture. To obtain the highest degree of efficiency in partial dentures it is necessary to grind the teeth to precision in order to remove the inaccuracies; this should be done after, and not before vulcanization.

In conclusion I wish to state, that in my opinion it is quite evident that this branch of dentistry is more intricate and requires greater accuracy from start to finish than any other. I wish to emphasize that, not only technic but vision as well is necessary in order to measure up to the highest standards of this particular phase of dentistry.

I desire to take advantage of this opportunity to express my deep appreciation to Dr. W. E. Cummer, of Toronto, members of the Detroit Dental Clinic Club and many others in the profession, for fathering me in this work.

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"X-RAY STUFF"

BY GEO. H. MEANS, D.D.S., LOUISVILLE, KY.

CLINICAL INSTRUCTOR, DENTAL DEPARTMENT, UNIVERSITY OF LOUISVILLE. CHAIRMAN OF THE X-RAY UNIT OF THE JEFFERSON CO., KY., DENTAL SOCIETY

(A FEW POINTS GLEANED DURING THE INVESTIGATIONS OF THE UNIT)

(For The Dental Summary)

THE X-ray, by opening up to our vision the structures in which we have worked so long in blind faith and frequent grief, is proving itself an invaluable aid to the progressive and conscientious dentist in rendering dental services which will reflect to the credit of ourselves and our profession.

Text-books on radiography are numerous, some comprehensive, and others pertaining specifically to a certain phase of the work, such as Dark-room technic, or Interpretation, and this article is inspired by the fact that many of the simple but important points herein contained have been overlooked or drowned in the mass of material on the subject, due, probably, to the extreme erudition of other writers.

It is not intended that this treatise should be regarded as a complete technic for the beginner, nor will the thorough X-ray technician find herein much for his enlightenment; but it is to be hoped that the intermediate student will gain some ideas to his advantage.

Let us, then, in the consideration of Radiograph Technic proceed in proper sequence.

SELLING THE SERVICE

Granting, to begin with, that an efficient apparatus has been installed, it may not be amiss to say a few words as to the best way of getting a return on the investment, which is none too small.

There are two ways of selling X-ray service: the direct method and the indirect method.

When a dentist stops in the midst of an operation and tells the patient that the tooth or teeth should be X-rayed, explaining the reasons therefor and mentioning the cost if he deems best, or if he is asked, he has made a direct sale of X-ray services. This occasions considerable lost time to the dentist and will be found more or less unsatisfactory for other reasons, especially when the operator is rushed.

Another method of making a direct sale of X-ray service consists of having a file of the names of every patient for whom a devitilization has been done, and sending them a letter at stated intervals recommending that an X-ray be taken. This may include all dead teeth, pyorrhetic teeth—in fact any case in which the dentist honestly thinks the service advisable. This is doing patients a real favor, and the letter can be couched in such terms as to convince them that you are genuinely interested in their health.

The indirect method of selling X-rays is to regard them as part of your professional services, and taking the same attitude in regard to them that you do towards root-filling and other phases of our work wherein the patient does not have to have a preliminary explanation; and the less understanding, in some cases, probably the better.

A liberal allowance for X-rays should be included in the estimate if one is asked for in advance, and the fact that the patient is told that this price "includes the X-rays" has cinched many a good fee when the party was hesitating.

The knack of making the patient take the X-ray service as a matter of course instead of regarding it as almost an ordeal, will result in an extensive use of the apparatus which will make it financially worth while for a dentist to have one; and this statement should not be misconstrued to mean that the X-ray ever should be used as a *means of revenue*, but in a conscientious effort to render better services.

TAKING THE PICTURE

Along with the consideration of the distance of the subject from the tube and the correct angles for length, it is most important that due caution be taken to give the tube a slightly distal inclination to allow for the compensating curve of the human arch, lest a clear-cut detail be lacking, and the fine line of the peridental membrane, which is essential to the perfect picture be obscured.

In taking the upper anteriors, the patient's head should be tilted slightly back, the film placed horizontally on the teeth with the lower incisors resting lightly on the front edge. The tube should be very high for this field, and by this method the radiographer will come nearer to getting the four incisors in correct focus than by bending the film and pressing it against the rugæ.

It is true that a more perfect detail about any single incisor apex can be obtained by the latter method, and when a single tooth is under suspicion and the diagnosis questionable, the film should be bent and pressed against the rugæ, and the rays turned on the suspected apex with the accuracy of a rifle-shot.

In taking the lower anteriors, the position of the film and head is the same and the tube should be directed at the point of the chin.

For all of the other teeth the head is in the best position when the occlusal plane of the lower teeth is level with the floor, when the patient's mouth is open for the holding of the film in place.

In placing the film for the molars, care should be taken always to have the front edge even with the mesial surface of the first molar. This always will include all of the first molar, and the film will run sufficiently far back to get all of the third molar in practically every case, even though it be impacted; yet the film is not sufficiently far back to cause gagging.

The patient frequently flinches during the adjustment of the film for the lower teeth, due to the fact that the operator has the film close against the teeth and lingual mucosa as he forces it down, impinging these tissues severely. The film should be inserted on a slant toward the base of the tongue, forced down gently, straightened up and drawn against the teeth and gums. This will cause the patient little if any pain, due to the looseness and yielding nature of the tissues in the floor of the mouth.

For the lower bicuspids the film should practically always be used vertically, or "short ways," and in a great many mouths it will be found advantageous in the upper arch as well.

It should be borne in mind that the less the film is bent in taking the picture the better, and it is true in practically any area of the mouth that a picture can be obtained without bending the film. If the operator will take a moment's time to study out the line bisecting the plane of the film and the plane of the tooth, and will adjust his tube at right angles to that imaginary line, his distortion of the image will be held to a minimum.

EXPOSURE

So far as the writer has been able to determine, there has been published nothing very comprehensive on the subject of exposure, and while it is obvious that space for an exhaustive analysis of the subject cannot be had in a treatise of this class, we will at least attempt to give a few ideas that may serve as a basis from which the intelligent radiographer may work up the subject for himself if he be so inclined.

The length of time to expose the film in the mouth to the action of the X-rays demands the best attention of the radiographer, for unless he be right on this point, all other things being perfect he cannot have a high-class negative. And after the inspection of several hundred negatives, borrowed from various radiographers, the writer believes that the majority of operators will be vastly benefited by the adoption of the Exposure Chart which is used in the Mayo Brothers' Sanitarium and which, so far as the writer knows, has never before been made public.

According to the technic of this great institution the public is divided into five types for radiographic purposes, namely:

Extra Light——Light——Medium——Heavy——Extra Heavy.

The classification of patients accordingly is simple. The little, thin-faced, anemic woman would naturally be placed in the "extra light" class; the flabby fat man or woman would be classed as "heavy," while the individual of equal weight, or greater, with strength and power and firmness showing plain in every line of his compact frame would, obviously, be classed as "extra heavy," and so on with the classification according to judgment.

The various parts of the mouth or teeth should be divided into areas and numbered accordingly.

Molars	Bicuspids	Incisors	Bicuspids	Molars
1	2	3	4	5
Molars	Bicuspids	Incisors	Bicuspids	Molars
6	7	8	9	10

Thus an exposure-chart can be made up, covering every area in the mouth of every type of patient, and a glance at the chart will designate the proper length of time to expose the film to the action of the X-rays. Realizing the vagueness of the above explanation we reproduce the exposure chart used for three Engeln X-ray machines used at Mayo Brothers' Sanitarium.

	M	B	I	B	M	
	1	2	3	4	5	
R						L
	M	B	I	B	M	
	6	7	8	9	10	

Area	Ex-Light	Light	Medium	Heavy	Ex-Heavy
1	6	7	8	9	10
2	2	3	4	5	6
3	3	4	5	6	7
4	2	3	4	5	6
5	6	7	8	9	10
6	3	4	5	6	7
7	1½	2	3	4	5
8	2	2½	3½	4½	5½
9	1½	2	3	4	5
10	3	4	5	6	7

The reader must not expect to take this exposure chart and apply the figures therein contained to his own X-ray. Different types of machines vary in power of rays, and even though a reader may happen to have a machine of the name mentioned, he may not find the figures accurate, due to such things as line variance of electricity or line leakage.

Each operator must make up an exposure chart to suit his particular machine, and to do so it is not necessary to go forth into the highways and byways in search of fat men, anemic women or normal types of both sexes, explaining to them your needs and urging them to pose as subjects for an exhaustive and possibly dangerous routine of X-ray exposure.

With the simple data chart pictured below one can, in the normal course of his radiographic practice, in time, work up a dependable exposure chart for his own machine. Whenever an X-ray is taken, inscribe the patient's name and check off the type, note the area and time given and the result.

Name	Type	Area and Time	Results
J. G. Jones	*Medium*	*Area* 2 Sec. 4	*Under ex., 1 sec.*
Miss A. Brown	*X.-Light*	*Area* 12345678910 Sec. 623263222 3	*2-4-7-9- Under ex.*
H. B. Adams	*X.-Heavy*	*Area* 5 Sec. 10	Good.
Mrs. J. A. Jacobs	*Light*	*Area* 5 Sec. 7	Good.

In the course of a few months the radiographer will have had enough of the various types of patients to compile the data into an exposure-chart. Of course the idea can be continued indefinitely; the more data compiled the more infallible becomes the chart and the more infallible the chart the better negatives will be obtained, and proportionately will that bane of the radiographer's existence "Interpretation" be lessened.

DARK-ROOM TECHNIC

Let us remind the reader that the X-ray film is a thin sheet of celluloid, coated with a gelatin emulsion which is impregnated with silver bromide salts. It is the silver which takes the image, but that image cannot be seen until the gelatin is acted upon by solutions which have the power to reduce the bromide from the silver. This is a chemical process called "the development of films."

For this purpose two solutions and two bowls of water are needed as well as a supply of hook clips. The special X-ray developer furnished by the Eastman Co., is in a more concentrated form, and will give better results on X-ray films than the M. Q. or Kodak developer, though the latter may be used in an emergency with apparently good results.

An acid fixing-bath also is needed to prevent the image from fading, after it has been brought out in the developer, if it is exposed to strong light. This preparation can be obtained wherever kodaks are sold.

Any water that is fit for drinking purposes will do for the developing of films. Distilled water will be better, but it is not necessary.

The four vessels should be arranged in the following order:

Water——Developer——Water——Acid Fixing-Bath.

During the development of films the only light permissible in the X-ray laboratory is a very dim light through a ruby or green glass.

In opening the packet do so in such a way that the films can be withdrawn by the edges, never catching them between the thumb and fingers, lest finger-prints be impressed in the emulsion, which is easily done.

Immediately attach to each film a hook clip. These clips are made of monel metal, and there will be no chemical reaction due to the metal in the developing solution.

First slip the films into the bowl of water sufficiently long for the dry emulsion to become thoroughly saturated, which will cause the developer to have a more even action.

These developing chemicals have the most definite effect at 65° F., and at that temperature their action is complete in five minutes. If the temperature varies above 65° F., the developing time should be increased twenty seconds for each degree up to 70° F. And if the temperature of the developer is below 65° F., the time that the films are left in should be lengthened twenty seconds for each degree down to 60° F. Below 60° F. the developing agent (metol-hydrochinon or substitutes) becomes inactive and above 70° F., the action of the developer is entirely too rapid for best results. A loss of quality will invariably result even though the emulsion is not reticulated.

The developing of X-ray films thus should be a systematic procedure, simply giving the chemicals the time known to be necessary for the completion of their action.

The principle of taking the films from the developer and attempting to judge their proper condition by the dim light of the ruby lamp is erroneous. While it is doubtless true that this is the method of professional photographers, it is because the time-and-temperature method is impractical with their large quantity of work, and furthermore vast experience lends them an acuteness of eyesight before the ruby lamp and a judgment of density that the average dental radiographer can hardly hope to achieve.

The idea of lengthening the time of development for underexposed films in hopes of forcing out an image is absurd. The image is not made in the developer; it is made at the X-ray machine and the only action of the developer is to reduce the bromide from the silver, and this is complete in five minutes at 65° F.; and the only thing accomplished by prolonging the development is to fog the already weak high-lights and completely ruin a negative that might have been possible of interpretation.

And likewise, the principle of shortening the development of an over-exposed film in an effort to prevent it from getting dense or opaque is erroneous. By so doing only a superficial action of the developer is allowed, and unless all of the bromide is reduced from the silver the details of the image cannot be seen. There is nothing more useless than an under-developed, over-exposed negative. "All films should be left in the developer for the same length of time at a certain temperature regardless of exposure," says Wendell. The chemical action of the developing solution should be carried to completion and no further.

To return to our films which we left hanging in the developer for five minutes. They should now be removed and flushed in the third vessel containing water, for several seconds, to remove the developing solution, and then placed in the acid fixing-bath. If this precaution of washing is not taken, the acid will have a chemical reaction on the residue of the developer on the films, which makes a stain, red by transmitted light and green by reflected light. This is one of the most troublesome stains in photography, and should be prevented by a little precautionary washing.

The films should be left in the acid-fixer twice as long as it takes for them to become rid of all the "milky" emulsion and the whites perfectly clear and transparent, which will usually be from fifteen to thirty minutes. Then they should be washed in running water for nearly an hour and hung up to dry in a place as free from dust as possible.

HOT WEATHER TROUBLES

The development of X-ray films in summer is attended with the danger and vexation of having the emulsion on the celluloid soften and thicken, ruining the image and in extreme cases sliding completely off the celluloid.

There is no remedy. It simply must be prevented by the precaution of getting the solutions to the right temperature and keeping them there. Between 60° F. and 70° F. will be satisfactory for the waters and the acid fixer, but the developer should be brought to a temperature of 65° F. as previously explained. Ice should be used to hold the solutions at these temperatures, and ice should be put in the vessel with the negatives while they are washing under the tap.

The Eastman Co. does not advise the addition of alum or any other chemicals to the acid fixing-bath for hardening purposes, but mentions that they may be used as separate baths after fixation.

It is the writer's experience that they are unnecessary, all that is needed being a control of temperature of the solutions, an increase in the length of time that the negatives are left in the acid fixer up to thirty or forty minutes, and a shortening of the washing time.

MOUNTING AND FILING

The mounting of X-ray negatives offers little if anything new. The radiographer should be well equipped with mounts containing openings—for any number of negatives that he may have of a certain case. The practice of handing the patient a full mouth-mount, with only half the openings filled, does not give an impression of efficiency or of professionalism. Every mounting should be especially prepared with the radiographer's name and address imprinted thereon.

The best method of filing the negatives seems to be in envelopes of a size about three by five and a half inches which allows ample space upon the front for any data concerning the case.

Case No.	NAME
1249.	Mrs. James Walsh, 127 E. Broadway, Louisville, Ky.

REFERRED BY
Dr. R. A. White.

HISTORY. Patient complained of neuralgia on left side of face.

Diagnosis. Left Superior 2nd and 3rd molars abscessed.

A degree of responsibility rests upon the radiographer, and he will be wise if he protects himself with careful records of his cases and has these records and negatives arranged in neat files where they are at his disposal at any future time on a moment's notice.

INTERPRETATION

Space is not available for a consideration of the interpretation of X-ray negatives, but we believe that ninety per cent of the difficulty lies in the poor quality of the negative itself.

A perfect negative is usually easy of interpretation, and the radiographer who is having trouble in this phase of the work will find it greatly simplified by greater care in technic.

It will also doubtless prove an advantage for the average radiographer to make a close study of X-ray pictures of normal conditions. Most of the negatives seen are of diseased areas, and a clearer mental picture of the appearance of the normal will aid materially in the diagnosis of suspicious cases.

Cherokee Apts.
1347 Bardstown Rd.

Bibliography.
"The Systematic Development of X-ray Films and Plates," Wendell.

THE AMALGAM FILLING*

BY CLYDE H. HEBBLE, D.D.S., COLUMBUS, OHIO
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WHEN the subject of dental amalgams is mentioned we are likely to give the matter a more or less casual consideration in a subconsciously comfortable way, and then pass on to some newer and as we think, more complicated and, possibly, more important phase in the practice of dentistry. However, you know there is an old axiom that "familiarity breeds contempt," and it is surely apropo in its application to the relation of the amalgam filling and the average dentist. How many of us stop for a moment to consider just where we would be without this material, in our effort to save the many teeth which we are enabled to do, although it is unquestionably the most abused of all filling materials?

If it is possible to obtain a passably good performance of amalgam when the technic of cavity preparation and manipulation of the amalgam itself is mediocre or less—the thought occurs to one, just how much would be added to its stability and all-round desirability by a more intelligent and considerate application of the principles of correct cavity preparation, proper mixing, packing, contouring and finishing of this most useful and versatile material.

In taking up the foregoing considerations the most desirable course to pursue is one which embraces the teachings of our greatest thinkers and originators in the dental world, for their methods have not only proven themselves to be entirely scientific and practicable but have also stood the test of time. Most of us make such a decidedly liberal daily use of dental amalgams that we are more or less inclined to slip into the proverbial rut, and after we are there, it is still easier to take the line of least resistance and repose gracefully in our easily assumed position. It is equally as easy to prepare each and every cavity carefully and correctly, thereby adding to our own self-respect and ultimately to some other dentist's respect for us, when the patient inevitably falls into his hands at some future time for a continuation of dental service.

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*One of a series of articles being written for THE DENTAL SUMMARY by college teachers.

No structure is stronger than its foundation, we are told; so of first interest to us is a properly prepared cavity for the reception of the amalgam. One of the greatest, if not *the* greatest shortcoming of the average dentist is his failure to even approximately follow the instructions of that great teacher, Dr. G. V. Black, in the preparation of his amalgam cavities. Owing to the fact that to follow Black means "extension for prevention," and the consequent removal of a varying amount of enamel wall, we take the "slacker" viewpoint and conserve our burs, chisels and engines, and preserve for the patient a great probability of recurrent decay at some point along the margins of the filling which we insert.

We all know that Class One (simple occlusal) cavities, occurring in the central fossæ of upper molars, should be extended throughout the buccal fissure to the bucco-marginal ridge and through the mesial fissure to the mesio-marginal ridge; that if the transverse ridge is even partially undermined, or is low, or is crossed by a semi-fissure, as is often the case, that we should cross through it to the distal fossæ and extend the distal fissures in each direction to their very end. The same can be said, of course, for occlusal cavities occurring in lower molars; that is, if a cavity occurs at any point in any of the fissures, or if there is a break at any point in the continuity of the enamel surface, the only safe thing to do is to extend the cavity so as to include all the fissures to their end, thus creating a filling which roughly resembles a Maltese cross in shape. We thus have made a *real filling*—not just a plug which the small round pits resemble which we see all too often. Such little "plugs" hardly ever do anything more than form an ideal spot for recurrent caries to begin its destructive action.

Class Two, or proximo-occlusal cavities, always should be extended to a self-cleansing area buccally and lingually, and especial care should be taken of the "resistance form" of the cavity; that is, unsupported, frail enamel walls should be broken down and the margins carried back to a point where they are supported by sound dentin at least one millimeter in thickness. If this requirement is neglected, in the course of a few months time, portions of the short enamel rods which are not supported will fracture away from the margins and we have a rough, scratching surface, annoying to the patient, and which retains food, especially the soft pulpy variety. Under these conditions but a short time elapses until a badly-undermined filling results.

The occlusal extensions of this type of cavity should always involve one or both fossæ, with proper "dove-tailing" or extension of the fissures radiating therefrom. We thus not only provide adequate anchorage for the filling but at the same time take care of the occlusal surface so far as recurrent caries is concerned. About the only instance where the occlusal extension should not be carried to the opposite fossæ in bicuspids is the case of those lower first bicuspids which occasionally have a very short and incompletely developed lingual cusp, with a high ridge connecting it to the buccal cusp. This ridge is sometimes so high and thick that it is rarely undermined to any great extent, if at all, so that it is possible to secure the "dove-tail" retention without going through the ridge to the opposite fossæ.

Removal of all traces of soft, leathery dentin, the creation of a flat floor, and of definite right angles, line angles, and point angles, are the remaining considerations which should demand one hundred per cent. of our attention before we decide to make our mix. And, finally, do not forget the marginal bevel, which in the case of the average amalgam preparation, should be buried in the external enamel line to a depth approximately one half the thickness of the enamel at that particular point. This can best be accomplished with Simpson's set of chisels, and if properly executed, will result in a beautiful, graceful outline when the filling is inserted, trimmed and polished. The cervico-marginal bevel of the proximo-occlusal cavities is probably neglected more often than any other, and it is the one point which should come in for special attention, for if allowed to remain ragged and fragile, the chances of a filling becoming undermined are increased several fold. It is a particularly vulnerable point.

The matrix band should be used in the restoration of all cavities involving more than the occlusal surface of the tooth, for it is impossible to secure good condensation of the amalgam in any other way. Cavities which involve the greater portion of the crown of the tooth, those which in the past have more often been restored with a gold shell crown, should have their retention augmented by straightening up the side walls and floor of the pulp chamber, thus creating a "counter-sunk" preparation, which in extreme cases can be improved by the use of one or two base-metal dowels, cemented firmly into the canals. By using a full or partial matrix, as the individual case may demand, and then malleting the filling in position, we will be able to secure maximum condensation and solidity, and at the same time have made a restoration which is infinitely more sanitary than the best-fitted shell-crown could possibly be; and withal, one which in most cases will be more durable.

Class Five, those cavities occurring in the gingival one-third of the tooth, when prepared properly for the reception of amalgam are in most cases a much more simple operation; but one point of permanent importance is the necessity of always extending the cavity far enough to include all blanched enamel surfaces. This is a condition of the enamel which, even if not so deep and extensive as to extend entirely through the enamel to the dento-enamel junction, will, nevertheless, in a majority of cases, sooner or later result in the complete disintegration of the enamel, with subsequent exposure of the underlying dentin. The floor of Class Five cavities should follow the same degree of convexity as the external surface of the tooth at this point, and its junction with the sidewalls should form either a right or an acute angle. A wheel bur will cut a retentive groove in the ends of these cavities. Always use care that this groove is cut under or just a little deeper than the dento-enamel junction—otherwise unsupported enamel at this point surely will be the result. The marginal bevel of these cavities should be approximately one-third as deep as the enamel is thick and should be uniform in width.

Having prepared the cavity, the next consideration is the filling material. Amalgam for the filling of teeth was first used in France about the year 1826, and was referred to as "silver paste," being composed of silver and mercury alone, and must have given very unsatisfactory results as compared with those secured by the use of our present-day modern alloys. The difficult amalgamation of silver alone, with its characteristic quick setting properties, made its manipulation exceedingly difficult; and after being placed in a cavity the setting was so rapid as to render any considerable amount of contouring and finishing impossible. A further objection to silver alone with mercury was its tendency to expand beyond the margins of the cavity. However, thanks to a score or more of men who could see the possibilities of dental amalgams and whose ambitions were not easily balked by failure and adversity, we are now possessed of a variety of dental amalgams—almost any of which will give a good account of itself under average conditions.

The more noteworthy properties of amalgam which render it of value as a filling material are: First, its plasticity and comparative ease of manipulation, thus making it possible to restore lost contours of teeth in the more inaccessible places in the mouth where the use of the gold foil filling or even gold inlay would be exceedingly difficult. Second, its property of being but slightly affected by the oral fluids, and the fact that it is fairly stable as to bulk and shape; and last but not least, in the minds of many patients, I am sorry to say, is its cheapness, as most dentists see fit to build fillings of amalgam for a much smaller fee than they receive for gold. This latter condition of affairs has one thing to recommend it, however, in that amalgam preserves and restores a greater number of teeth to normal usefulness than any other filling material.

The more pronounced objections to the old-time amalgam were its discoloration of the tooth in which it was placed; its comparatively large expansion range; its poor edge-strength due to extreme brittleness, and the inability of the operator to adequately contour and trim the filling, because of its rapid crystallization. All of these objections have been more or less eliminated in the modern alloy. The expansion of the silver was controlled by the addition of tin—the edge strength was added to by the addition of a slight amount of copper, while the manipulative qualities and color were much improved by the addition of zinc. Later results have shown that while zinc imparts ease of amalgamation, smoothness and color to an alloy, it at the same time robs the amalgam of some of its edge-strength and crushing resistance.

Edge-strength of amalgam is governed by at least four considerations: First and very naturally by the metals entering into the alloy. The greater the proportion of silver entering into the amalgam up to seventy-five per cent, the greater the edge-strength; above seventy-five per cent, it becomes more brittle. Second, the manner of packing, or rather, lack of sufficient packing—with properly-shaped pluggers. Third, the amount of actual union between mercury and alloy. Fourth, bulk of amalgam at the margin, which of course is governed by the depth and width of the marginal bevel.

The "flow" of amalgam is the term often used in describing the tendency of amalgams to flatten or move under stress. Most individual metals will yield or flatten under a given stress in proportion to the load, up to a given point, and then cease unless the weight is increased. However, amalgam continues to yield slightly as long as the pressure is continued, even though it is not increased. This peculiarity of amalgam partially explains the distortion of amalgam fillings often observed when they are used to restore the greater part of the crown of a tooth and are subjected to unusually heavy stress. Amalgams differ as to amount of force necessary to produce this flow, but the fact remains that no amalgam is entirely free from this peculiarity.

Modern practice seems to show conclusively that the so-called "high percentage silver alloys," with the minimum of zinc, or no zinc at all, are most desirable, because of their greater permanency as fillings, even when subjected to unusually hard usage. An alloy containing seventy parts of silver, twenty-eight parts of tin, and two of copper, when properly amalgamated has proved itself to be a very desirable combination. It will possibly amalgamate with a little more difficulty than a zinc alloy, but the additional qualities of greater edge-strength and lack of distortion more than compensate for that quality.

Generally speaking, equal parts by weight of alloy and mercury should be used. A scale or balance will determine this quickly and exactly; there should be no guessing, and the mixing should always be done in a mortar with a pestle. The use of so-called "washes" for "brightening" the amalgam, such as grain alcohol, or a two per cent. solution of hydrochloric acid, should be discouraged, as it very materially lessens the edge-strength and crushing resistance of the filling.

Those alloys which are new and freshly cut will amalgamate with more difficulty than an aged alloy, but at the same time, make a slightly stronger filling, when used under similar conditions. They require more mercury to amalgamate, and set very rapidly. This phenomena is due to the fact that an alloy slowly anneals itself when undisturbed over long periods of time at ordinary room temperature.

As already intimated, all medium or large-size amalgam fillings should be malleted into the cavities, always using a matrix on anything but a four-walled cavity. A mix should be immediately broken up into small pieces after amalgamation has been completed and a single piece malleted into each retentive angle of the cavity first, then built up in a manner very similar to that employed for a cohesive gold filling.

After malleting in an excess amount over all the margins, the occlusal carving should be immediately begun, using Frahm's set of three amalgam and wax carvers for the purpose. Care should be taken, so far as possible, to restore whatever occlusal anatomy has been destroyed in the preparation of the cavity. Failure to do this has many dire consequences. An abnormal occlusal restoration of either filling or crown results in traumatic shock to that individual tooth, usually resulting in the establishment of a pathological condition of the peridental membrane and the consequent loosening and often complete loss of the tooth. This can be blamed to a perversion of stress in the occlusion brought about by improperly-contoured fillings and crowns. Poor contact point or no contact at all is another factor in producing this condition. Add to this the fact that fibrous food forced into the proximal space invariably tears loose a portion of the peridental attachment, thus forming the nucleus for a pus pocket, and we begin to have a higher regard for the topographical features of a filling.

In addition to restoring the cusps, incline planes, fissures, and fossæ, great care should be given to the disto-and mesio-marginal ridges. Failure to restore these ridges permits the food to be forced into the proximal space unless contact point is unusually wide and firm.

Last but not least comes the cervical margin. How many of these margins do we find trimmed off flush with the tooth surface? Far too few, I regret to say. It is not at all difficult to imagine the result of permitting a mass of metal to protrude into the proximal space, forming a permanently chronic irritant to the soft tissues, retaining food-stuffs and doing many other undesirable things too numerous to mention. A set of Eddy's Carvers, right and left, are admirably adapted for trimming off this excess and should always be used, even when a matrix has been employed, as a quantity of the amalgam is likely to be forced over the cervical margin between it and the band.

A combination cement and amalgam filling, or, as it is sometimes referred to, "the amalgam inlay," finds a useful and important field in taking care of large, simple, occlusal cavities, which have resulted in the complete loss of all dentin, leaving merely an enamel shell as all that remains of the tooth. These cases are especially plentiful in the mouths of children, and are often either extracted or covered with a gold shell crown.

The principal difference between a cement-and-amalgam filling and the amalgam inlay lies in the fact that in the case of the inlay, both cement and amalgam are used while in a plastic condition, first introducing cement into the floor of the cavity and immediately following it with a piece of amalgam. As the amalgam is packed against the floor of the cavity, the cement is naturally forced in lateral directions against the frail enamel side walls of the cavity. Any part of the cement which has been forced out over the margins of the cavity should be removed. By thus forcing the amalgam and cement against the walls of the cavity a considerable amount of adhesion to the walls is realized. This may be said to literally bind the enamel to the filling and enables the restored tooth to withstand without fracture a considerably increased amount of stress. .

Another useful field for amalgam is found in its employment to restore or build up badly broken-down teeth preparatory to placing a shell crown. Oxyphosphate of zinc cement should never be used to thus restore teeth, for the most excellent reason that it is capable of being penetrated by the pus-producing bacteria, and in those cases in which the caries extends below the gingival margin, no matter how well fitted the crown may be, if it does not extend farther gingivally than does the cement, a point of ingress is left open for the bacteria. This focus of infection is aided and abetted in most cases by the chronic presence of gelatinous food material and the normal secretions of the oral cavity, so that in the course of time the infection may reach the pulp chamber and canals. However, if all caries is removed prior to placing amalgam in such a tooth, and if the amalgam is packed into place vigorously, there will not only be a moisture-proof junction between it and the gingival margin but there will also be presented a surface which no infectious organisms can successfully pass through to the pulp chamber. Black copper cement is also a good material for this purpose but lacks the strength of the amalgam. A mixture of two parts black copper cement powder and one part alloy filings, and then mixed in the usual manner with the cement liquid, is recommended for this purpose also.

A resume of this familiar and most important subject of dentistry always points the way to a more satisfactory service by giving greater day-in-and-day-out consideration to each individual operation and the more or less exacting technic so essential to uniform success. It is largely a matter of conscience, and appreciation on the part of the operator of mechanical exactness and attention to detail. The opportunities afforded by amalgam as a filling material are great and varied; so let us hope for and look forward to the day when the dental profession as a whole will display, by its daily work, that it not only knows of but is putting into practice, these correct concepts and principles.

830 So. High St.

AN AWAKENED PROFESSIONAL RESPONSIBILITY*

BY E. W. MARTINDALE, D. D. S., COLUMBUS, OHIO

DENTISTRY has been practiced in some form for centuries, no doubt, but it was not until the years of 1839 and 1840 that a professional career was started. In those years the first dental college was founded by Dr. Chapin Harris, at Baltimore; the first dental society was organized and the first dental journal was published. From this period on until Miller, by his discovery of the micro-organisms of the mouth, proved conclusively the cause of dental decay—the efforts of the dentists were principally directed toward repair and replacement.

Then it was that other micro-organisms were discovered in the mouth, and this opened a new field for thought and investigation, which has gradually developed, until now we are made to realize the great influence the teeth and their supporting structures play in the production of disease. Now, we know that our efforts cannot be put upon the hard structures alone, such as the enamel, dentin and alveolar process, but the soft tissues, the gums, pericementum and the pulp are chiefly involved in permitting the ingress of bacteria into the lymphatics, and finally into many systemic infections.

The most frequent conditions which are conducive to these infections are:

First—Unsanitary, neglected mouths with decayed teeth and decomposing food.

Second—Diseased pericemental tissues.

Third—Nonvital and infected teeth.

When we realize how few of the people use a tooth brush and how poorly those few use it, the picture of these horribly unsanitary mouths is not overdrawn. Inflamed and congested gum tissue, broken down and decaying teeth, green and brown stains, calcareous deposits and decomposing food debris are the rule and not the exception.

The influence of the great numbers of bacteria found in the mouth, is noticeable on the tonsils, pharynx and gastro-intestinal tract. Especially is the toxic effect of unclean mouths noticeable in children, producing headache, dizziness, imperfect vision, diarrhea and malnutrition—and these ailments, though considered minor, are only secondary when considered along side of systemic infections which are very often produced by penetration of bacteria into the mucous membrane of tonsils, pharynx and intestines.

A very important factor is that of inflamed gums and supporting tissues of the teeth. Dental pathologists have repeatedly called attention to the dangers of pericemental infections as a probable cause of systemic disease. Prof. Noyes gives pretty definite proof of the network of lymphatic vessels in the pericemental tissues even to the extreme borders of the gingiva. These afford the ingress of bacteria through these vessels into the blood stream, and subsequent localization in other tissues of the body.

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*Read before the Rehwinkel Dental Society, March, 1921.

We have plenty of scientific and clinical evidence to prove that pyorrhea is a cause of much systemic disease, which may be induced in the following ways:

First—The constant exudation of pus into the mouth and then into the digestive tract.

Second—The absorption by the lymphatics of the bacteria and their toxins.

Third—The pumping action of loose teeth in their sockets during mastication, forcing bacteria and their toxins into the capillaries and thus into the blood stream.

The estimate that more teeth are lost from pyorrhea than by decay or dental caries is probably correct. These pericemental infections, with inflamed gum tissue, must be considered in the prevention of tuberculosis, the next great step in the elimination of which will be sooner accomplished when unhygienic conditions in the mouths of people are bettered.

The medical man must realize that the gingival borders of the gums present an area fully eight times as great as the crypts of the tonsils and that in the average mouth the gums are congested and bleeding, making an ideal culture medium for tubercle bacilli. It is not any wonder then that the medical profession finds a great hindrance in the combat of this disease, when pathological conditions are sure to exist, with a lowered body resistance, due to the absorption of such poisons.

We also must recognize another danger, which is very serious, that of infected areas within the bone tissue at the apices of the roots of teeth that were heretofore unsuspected. There is no soreness produced in many of these apical infections and they may remain undiscovered for a long time because of the subtle action of the streptococcus viridans.

Rosenow, Hartzell, Thoma and others have proven clearly that under some conditions the streptococcus viridans in these special infections become aggressive and migrate, developing a selective action which varies in affinity for different tissues of the body which are the cause of some of the serious infections of the heart, kidneys and joints. It has long been recognized that oral infections were responsible for certain types of nervous diseases.

Because of the great prevalence of these apical infections, they become the most serious menace to health that has been presented to the medical and dental professions. It seems like an almost hopeless case, doesn't it, when we think of how common dental caries is, that it is difficult to find three children out of one hundred who have perfectly sound teeth? As a result, there are very few people, thirty years or upward, without pulp involvement of some degree and generally an apical infection. Dentistry, then, cannot be looked upon as a luxury alone, but, in some form, an *absolute necessity* for every one. We must admit that we are facing our most serious health problems in these pernicious mouth conditions. Hygiene of the mouth *must be* considered as the most important health measure.

These pernicious mouth conditions are unnecessary. We know that the bacterial plaques which are the initial stage of decay, should be removed often for such prevention. That frequent removal of calcareous deposits around the necks of teeth is most effective in the prevention of infections in the dental tissues supporting the teeth. That faithful daily care of the teeth, using the brush intelligently in conjunction with a good dentifrice, is the best way of removing food debris. That most of the micro-organisms found in the mouth are harmless if deprived of pabulum upon which to feed and grow.

Knowing, as we do, that these things are so, are we doing all that can be done in a practical way to aid the laity in preventing dental decay, pericemental infections and appreciating a clean mouth and sound teeth?

Sometime since, Dr. Mayo said, "The next great step in preventive medicine should be made by the dentists: the question is, will they do it?"

It is said that "Scarcely had the last gun belched forth its valedictory to war, when a new gun burst forth with a salutation to all France—Good health is built on perfect teeth." The campaign to educate the public in the care of their teeth has been instituted through the military department. Short, clear remarks are inserted in the French publications, to the effect that while France has lost heavily in life and property, all can be speedily regained if the adult and youth-life quickly regain complete health, and this is accomplished quickest by having a clean mouth and clean teeth. "Consult your dentist or your physician."

Coming home, let me ask what has been done in your city or community, in a satisfactory way, toward enlightening the public? Or what real praiseworthy step (to interest the public in the value of good teeth) has your local dental society taken and is the program now in force?

Treat the subject from the standpoint of what it will do for humanity, and put in the background the pecuniary advantage to the dental practitioner, get the spirit of: "What can I give?" not, "How much can I grab off?"

We should be able to give every patient coming in contact with us, clear, clean-cut instruction as to the importance of the teeth and how to take care of them properly, giving instruction as to how they should be brushed and what should be used, and the importance of massaging the gums once a day, call attention to congested or bleeding gums, and chronic abscesses, and make them see that these things are more vital than decayed teeth. We are not doing our full duty to our patients, if, in making an examination of their mouths, we not only find all-existing decay which may have started, but also look for all pathological conditions which our experienced eyes will detect. Take the time necessary for all this and charge for such service rendered.

You may be asked the question, as was one dentist, "Does God Almighty intend for us to run to the dentist every little while to get our teeth fixed?" This is the answer he gave: "No, sir; He did not intend us to live in hot-houses, eat soft, hot, or sweet food and leave part of it around the teeth to decay. If we persist in such a mode of life we must do something to counteract the evil effects thereof."

Someone (a layman) has said, "So doctors and dentists have at last found out that it is better to uncover than to cover up." *Get that?*

The component society may have carefully-edited articles published regularly in the local papers. These should be carefully selected and edited because a great many articles published in magazines and daily or weekly papers are productive of a good deal of harm and no good.

In almost every community there are such organizations as the Parent-Teachers, Civic Clubs, Rotary, Kiwanis, Exchange and Athletic —to which addresses and lectures, illustrated or not, at frequent intervals, are welcome and productive of great good.

It is about time we throw off that feeling that we should not appear in any of this work for fear of what our fellow-dentists might think or say, and that we refrain from criticism of those who do such work but be ready to slap him on the back and say, "I am with you, 'old man'."

The "inevitable" in the nature of appointment of Director of Dental Treatment to the Board of Education and various county and state officials of various names and authorities will soon be upon us, and shame be upon the dental profession if not ready and efficiently equipped to meet the demand.

We, who have been outside the college walls for a few years need also to get into the fundamental sciences, especially that of biology where something beside social prestige, society politics, personality and salesmanship is depended upon as criteria of success. Then we will have a working plan.

Ruggery Bldg.

MAKE YOURSELF NECESSARY

Making yourself necessary makes the road to success. But to make yourself necessary you need to consider the real or fancied requirements of those whose custom or favor you seek. Success will be qualified only by the degree of your imagination and resourcefulness.

GAS-OXYGEN ANESTHESIA IN RELATION TO MAJOR DENTAL SURGERY*

BY E. I. MCKESSON, M.D., ANESTHETIST, TOLEDO, OHIO

I APPRECIATE the honor of an invitation to address this allied profession. Perhaps the invitation came because I always have stood for a closer relation, which is rapidly being realized, between the dental and medical professions, an appreciation each of the other's viewpoint.

It is to be regretted somewhat that this meeting might not have been held next week, that we might have celebrated the discovery of anesthesia, one of the greatest contributions ever made to humanity and to the medical sciences. It would have been particularly fitting since Horace Wells was a member of the dental profession, and one whose name will go down through the ages to come as an everlasting benefactor of mankind. And since the agent, the physiological properties of which he discovered is the anesthetic under discussion, we might wonder why it is that anesthesia, which is now seventy-six years old, is not better understood by the majority of the dental and medical professions. To me the answer is clear. The dental and medical colleges have given about as much attention to the teaching of anesthesia as to medical jurisprudence. Colleges, like the two professions, have been faddish—they teach one anesthetic for a few years, then another comes into style, and so on, but never giving the whole group of anesthetic agents proper consideration in their relation to each other and to the conditions of the patient.

We should not use ether for everything and everybody; yet we have surgeons who even use it in pulmonary tuberculosis, a clear-cut positive, contraindication.

We should not use conductive and local in an infected mouth, but can you tell when a peridental tissue is free from infection? The throat surgeon cannot tell whether there is or is not a peritonsillar abscess, or an infected post-tonsillar pocket. Yet in both instances hypodermic needles are being forced through such areas, carrying the infective material on into healthy tissue to be deposited there with the solution. And what is worse, a certain amount of any local injection is forced into the blood stream. I imagine I hear someone say, "Nothing happens." Why then is it that multiple injections are warned against? Isn't it because of the marked constitutional and local reactions? What is a constitutional reaction if it isn't an infection of the blood stream? In an extraction where does the infection come from, after free drainage is established, by the removal of the tooth? Is it not a fact that there are more frequent and serious reactions with local or conductive anesthesia, than with general, or when no anesthesia has been used?

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*Read before The Ohio State Dental Association, December, 1920.

The throat surgeon should not chance local anesthesia in his tonsil operations. The tonsils are nearly always infected, and he cannot rule out peritonsillar infection at any time. The dental surgeon rarely encounters a mouth free of infection, and certainly should avoid local and conductive, when *visible* pus is present anywhere in the mouth.

There is risk in one form or another when you operate under any anesthetic, and there is greater risk, at least in the major dental operations, when you use *no* anesthetic, namely, shock. The great function of anesthesia is to prevent shock by relieving fear and pain. There may, however, be depression from the anesthesia itself, such as is commonly seen after long ether or chloroform narcosis, which, in part, offsets their good qualities as protectors from shock. Again the "mental strain" as one surgeon calls it, often persists for hours or weeks after a perfect local anesthesia.

In this paper I am not considering those minor dental operations which may be performed within five minutes, but limiting my remarks to the principles underlying the anesthesia for the impacted, unerupted, malposed teeth, tumors, multiple simple extractions with alveolectomy, plastic restorations, etc.

Nitrous-oxid-oxygen occupies the middle ground in anesthetics; it is not as depressing as ether, chloroform or ethylchlorid, on the one hand, and is a better protection from pain and mental shock than local or conductive, on the other.

Its toxic action is infinitely less than other anesthetics, regardless of dosage. Under its influence any operation known to dentistry as well as in general surgery may be successfully performed upon any patient. So far as the patient is concerned, gas-oxygen anesthesia very closely approaches the ideal of physiologic sleep.

It requires but a small fraction of the time needed for ether or local, and the patient's criticism of the operator and operation, his arguments and delays, his decision to interrupt a needed operation which may reflect upon the standing of the dental surgeon, are frequent experiences with conductive and local, but are eliminated with gas-oxygen narcosis.

The ideal in anesthesia never has been attained and perhaps never shall be. If hypnosis were efficient and could be successfully employed by all, it would approach quite completely what may be termed ideal anesthesia.

Like every anesthetic, gas-oxygen requires skill in administration; no greater, however, than others, if its action is understood and a suitable appliance for its administration is at hand. The great difficulty has been in securing accurate information regarding its action which should be seriously undertaken by teaching institutions.

For some time after the discovery by Andrews, that with the addition of oxygen, nitrous oxid anesthesia might be prolonged indefinitely, there were many efforts made to find a mixture of the two gases which would produce efficient anesthesia in all patients. But those efforts resulted in the conclusion that, owing to the differences among patients, no set mixture could be employed in prolonged anesthesia; that the proportion of the two gases must be varied to obtain the desired depth of narcosis, and that the guide for attaining the result must be the signs exhibited by the patient at the time of administration. To attempt anesthesia in a mechanical manner with a stop watch, for example, is like putting a blind engineer at the throttle. The interpretation of the signs displayed by the patient is the key to the situation. Since we can interpret the reactions of the nervous system only through muscular responses, we must center our attention upon the muscular phenomena as the only true guide that we possess in anesthesia.

The presence or absence of cyanosis has nothing at all to do with anesthesia itself. It is a quantitative reaction of the total hemoglobin to the total volume of oxygen in the blood stream.

The oxygen administered has two functions: *First*, to maintain metabolic change or oxidation in the body, and *second*, to regulate the dosage or concentration of the nitrous oxid by its dilution. Generally speaking, we regard the first as its most important function, but in certain shocked or anemic patients, the latter function comes into prominence because more than the quantity of oxygen required to maintain oxidation is required to prevent overdosing with nitrous oxid.

The following case in my experience illustrates the importance of the signs of anesthesia, the unreliability of a pink skin as a sign of safety, and the function of oxygen as a means of diluting the nitrous oxid to its proper dosage for the individual patient. This case is recited because it was more extreme in these points than others have been:

Mrs. C., a woman weighing about 110 pounds, between thirty-five and forty years of age, had been suffering from anemia for four or five years. Several prominent internists had treated her during this time, and on several occasions had advised the removal of twelve teeth, which in the X-ray films showed periapical rarefaction. The kidneys secreted an albuminous urine and there was so much prostration upon slight exertion that much of her time was spent in bed. The hemoglobin was twenty-seven per cent., with 1,250,000 red cells in the blood. She was excitable. After consultation among physicians and the dental surgeon the patient consented to the operation and gas-oxygen was agreed to be the safest anesthetic for her. On January 5, 1920, the anesthetic was begun by inhalations of one hundred per cent. nitrous oxid, but at the end of the third inhalation and while the ear and finger nails were distinctly pink (they had previously been quite pale) respiration stopped, the eyelids opened, and the pupils had dilated until only a narrow ring of iris could be seen. The muscles were completely relaxed in every part of the body. The pulse was weak and regular, but easily felt. These three breaths had overdosed the patient.

The lungs were promptly inflated or about half-filled with oxygen twice, and within ten seconds the iris began to retract; within a few more seconds respiration resumed regularly. On account of the few breaths required to thus overdose the patient, it was evident that the nitrous oxid would need to be highly diluted with oxygen to prevent a recurrence and, therefore, the apparatus was set for thirty per cent. oxygen and only seventy per cent. nitrous oxid; but the same signs recurred within five or six breaths, and again she was resuscitated with two inflations of oxygen. Now, fifty per cent. oxygen and fifty per cent. nitrous oxid were administered, and after several breaths the pupils began to slowly dilate and respirations became weaker. After a breath of one hundred per cent. oxygen had been administered, to prevent the further development of overdosage, forty per cent. nitrous oxid was next tried with sixty per cent. oxygen. This proved to be the ideal mixture for the patient and no further difficulty was experienced while the operation proceeded.

The operation lasted twenty minutes, in which time the teeth were removed, the alveolar process trimmed smooth with rongeurs, the gum margins trimmed and sutured so as to restore mastication by artificial dentures within a few days.

Semi-consciousness following the operation lasted for thirty minutes (instead of a few seconds) which was no doubt due to her unusually weak condition and to her anemia. There has been a gradual improvement in the general condition of the patient up to the present time.

Besides illustrating the fact that a patient may be overdosed with very low percentage of nitrous oxid without showing cyanosis, this extreme case emphasizes the importance of the true signs of anesthesia as a guide to the anesthetist, and the necessity for being prepared to resuscitate a patient by inflating the lungs with oxygen when respirations are accidentally stopped by over-saturation with nitrous oxid.

Another unusual but expected phenomenon occurred in this case: the moment when overdosage occurred each time, as well as at other times, there was no muscular rigidity, but extreme relaxation instead. This was due to the fact that we had the nitrous oxid in sufficient concentration to produce relaxation and also enough oxygen to prevent anoxemic spasticity. At no time was there anoxemia or cyanosis to produce spasticity. In the usual case when saturation is first attained the coincident anoxemia causes the muscles to become board-like or spastic, but relaxation comes promptly when sufficient oxygen is restored to them.

The two reactions of muscle, namely flaccidity and spasticity, are fundamental. The first is indicative of normal anesthesia and the second of anoxemia or the lack of oxygen.

SIGNS OF ANESTHESIA

The respiration, the eye, the muscles of expression, and other general muscles about the body are observed in making a diagnosis of the depth of anesthesia, or in determining the mixture required to produce the desired depth of anesthesia.

The third stage of anesthesia is divided into three planes: Light, normal and profound anesthesia. The profound plane borders on the fourth stage and may not be maintained except momentarily in securing complete or what I have termed secondary saturation, with nitrous oxid. For major dental surgery, normal anesthesia is required, but it often is necessary to invade the profound plane momentarily in order to attain the normal anesthesia.

Respiration—In light anesthesia the respirations are quite normal, and subject to reflexes due to trauma. In this stage breathing may be slow, regular and superficial, with inspirations longer in duration than expirations. The breath may be held with grunting or phonation, due to pain stimulation, and must be differentiated from such signs due to profound narcosis.

As light anesthesia is deepened to a normal anesthesia, the rhythm of respiration changes to a machine-like character, in which the inhalations and exhalations are practically equal in duration. The rate is usually increased to about twenty-five or thirty per minute, with no phonation or grunting, to ordinary trauma.

A further deepening of anesthesia to profound or dangerous degree is indicated by the rhythm being irregular, slower than normal, and showing variable degrees of prolonged exhalation. This latter sign differentiates this stage from light anesthesia. Phonation may occur in either inhalation or exhalation, but is of an unusual character. The spastic muscles of exhalation finally arrests breathing, due to the lack of oxygen which will not be re-established until oxygen reaches the blood and nervous system. Because of the spastic or contracted muscles, the oxygen should be *forced* into the lungs two or three times, after which respirations will re-establish themselves, providing of course, respirations have not been arrested too long. Promtpness is essential.

The Eye—In light anesthesia, stroking the lashes elicits reflex winking, as does also opening the lids or touching the conjunctiva. The eyeballs roll quite rapidly, and the pupils which are larger than normal, contract to light when the lids are suddenly pulled open. The slower the contraction of the pupils, the nearer to normal anesthesia.

Under normal anesthesia winking cannot be caused by stroking the lashes, pulling open the lids or by touching the conjunctiva. The pupils are smaller, contract very *slowly* to light or not at all, while the eyeballs are either fixed or roll very slowly. The eyelids are flaccid and do not resist when pulled open.

In profound anesthesia winking cannot be elicited, although in some cases the eyelids stand staringly open from spasm of the muscle, and where there is muscular twitching, incomplete winking movements may be noticed. The pupils do not react to light, but enlarge progressively until only a narrow margin of iris may be seen, the outline of which, in many cases, is irregular. The appearance of such an eye is so trustworthy that no time should be lost in increasing the oxygen in the mixture before respirations cease, necessitating inflation or forced artificial respiration. The eyeballs usually are fixed, but may jerk from convulsive contractions of the external eye muscles. The eye signs are observed whether morphin has been administered prior to operation or not, and are so important that no patient should be anesthetized without their guidance.

General Muscular Phenomena—In less specialized regions, muscular response is often of importance in determining the plane of anesthesia. The facial expression, movements of the extremities, contraction of the abdominal muscles, and the swallowing, retching and vomiting reflexes are among the most common points for observation.

As in the respiration and the eye, the general musculature is reflexly responsive in light anesthesia, so that the facial expression may be indicative of pain although unconscious of truama. The extremities move with more or less apparent purposefulness with trauma, while the abdominal muscles resist operative manipulations.

In normal anesthesia the general musculature is quiet and relaxed with an amount of muscular tone somewhat less than the normally-relaxed muscle.

In profound anesthesia, bordering on the dangerous degree, the muscles are spastic or rigid, so that if the patient is seated in a dental chair he may straighten out the legs and force himself up over the head-rest, or in abdominal surgery interfere with the surgeon's manipulations. Such a phenomena is observed after the patient has been anesthetized for some time; but in the beginning of narcosis profound anesthesia is more often indicated by clonic movements or jactitations. In this stage the vomiting reflex is not infrequently exicted. Swallowing, retching and vomiting is the sequence of this reflex, so that when swallowing begins, an immediate change in the mixture of the gases, giving a larger per cent. of oxygen, will abort vomiting in about eighty per cent. of the cases. There are other causes of vomiting which do not depend upon the anesthetic, and would therefore be uninfluenced by the change in the mixture.

Patients occasionally are encountered who are difficult to anesthetize or to sufficiently relax to properly operate upon. Perhaps these patients represent from two to five per cent., depending partly upon past habits, and of the community in which they live. Between these and the extremely easy cases there are all grades. Every patient may be anesthetized whether he is an alcoholic, morphin habitue or an athlete; but the difficult cases require greater nitrous saturation, and it takes a minute or two more time to induce narcosis. However, after anesthesia is established, it may be continued indefinitely, permitting the surgeon all the time he requires for impacted third molars, alveloectomy, etc.

PRIMARY SATURATION

Under ordinary conditions the best method to induce anesthesia is by administering one hundred per cent. nitrous oxid until the first anoxemic sign is observed. This is usually a slight snort or snore, a change in rhythm or character of respiration, the twitch of an eyelid, arm, or foot. Now from five to ten per cent. oxygen is added to the nitrous oxid—or more than this amount if unconsciousness has supervened quickly.

This primary anesthesia is sufficient for momentary operations and represents the narcosis practiced for many years in dental offices. Many operators, however, in the early days crowded the anesthetic until the patient was extremely blue or anoxemic, before removing the inhaler to extract, because, in so doing, they prolonged the anesthetic period, secured deeper narcosis, even though the patient did have some convulsive movements. They knew that these convulsive movements were not excitement (which many have supposed), but due to the temporary lack of oxygen, like the chicken with his head off. As soon as oxygen or air is inhaled the patient is quiet and relaxed. While this *approached* secondary saturation, it was not utilized in prolonged narcosis, to my knowledge, but constituted an exaggerated primary saturation.

Primary saturation is about as far as many dentists have progressed with gas-oxygen anesthesia, and there are those who think at this late day that gas-oxygen cannot be given for an hour or more for oral operations.

SECONDARY SATURATION

After primary saturation of the blood with nitrous oxid has taken place, and the patient is unconscious, there are many patients who would move if operated upon, or would resist operation by incoordinated muscular action. It also is observed that after the blood in the free circulation has been saturated with nitrous oxid, and primary anesthesia thus induced, (when about five per cent. oxygen must be added to the nitrous oxid to prevent anoxemia), that oxygen and nitrogen from the less actively circulating blood finds its way into the blood and brain. This lightens anesthesia about the second or third minute of narcosis, and necessitates a temporary decrease of the oxygen being administered at this moment. If it is apparent that deeper anesthesia will be difficult to obtain, the mixing valve is set for one hundred per cent. nitrous oxid until the signs of the profound plane have developed, namely, a dilated pupil, which does not react to light, prolonged exhalations, rigid muscles, and, in most cases, cyanosis. Then one or two breaths of either pure oxygen or fifty per cent. oxygen are administered to relieve the anoxemic spasm, leaving a relaxed, quiet, anesthetized patient. If the patient does not inhale the oxygen promptly the oxygen is actually forced into the lungs. At the next breath the patient should receive such a mixture as the anesthetist believes will fit the patient—usually between five and ten per cent. Subsequently, if errors are made in the mixture, or if the jaw is temporarily pressed upon in such a way as to obstruct breathing, necessitating a larger proportion of oxygen for a few breaths, resaturation may be required, but ordinarily this is not necessary in dental operations, where extreme relaxation is not required.

For several years I have resorted to secondary saturation in the management of obstreperous patients, and I have found none which could not be anesthetized with gas-oxygen.

CONCLUSIONS

First, Gas-oxygen anesthesia is applicable to all operations for any patient.

Second, Deep anesthesia may be obtained by secondary saturation, which more completely fills the blood and tissues than was heretofore thought possible.

Third, Secondary saturation consists of two procedures: *First,* of displacing as much of the oxygen and nitrogen with nitrous oxid resulting in spasticity, and following this immediately by enough oxygen only to restore normal anesthesia with flaccid muscles.

Fourth, The true signs of anesthesia are muscular phenomena.

NOTE:—Secondary saturation should not be attempted unless suitable equipment is at hand for inflating the lungs with oxygen.

STANDARDIZATION OF NITROUS OXID-OXYGEN ANESTHESIA INDUCTION*

BY J. A. HEIDBRINK, D.D.S., MINNEAPOLIS, MINN.

IN EARLY DAYS before oxygen was used in combination, nitrous oxid, because of its fleeting qualities, was limited in its scope of usefulness. There was time only for short and hasty operations. When apparatus first appeared for combining oxygen the anesthesia could be prolonged, providing the anesthetist was sufficiently skillful to anticipate symptoms and make adjustments in the constantly varying mixture, due to the crude proportioning devices then obtainable. However the addition of oxygen was a long step in the right direction.

Some became expert and administered beautiful anesthesia. Some were moderately successful. The majority failed miserably. There being no uniformity of dosage, there could be no uniformity of induction. The result was an exaggerated idea of the variation in susceptibility of individuals to nitrous oxid. These failures created in the minds of many the idea that there was something mysterious about nitrous oxid-oxygen administration, and that to be successful, one must possess the *sixth sense.* Much of this impression still persists and is the *bugaboo* standing in the way of many good and capable men beginning the use of nitrous oxid anesthesia. With present-day apparatus, accurate predetermined dosage can be delivered and nitrous oxid-oxygen administration is *very* much simplified.

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*Read during the Sixth Annual Meeting of the Interstate Association of Anesthetists in Joint Session with the National Anesthesia Research Society and the Odontological Society of Western Pennsylvania, William Penn Hotel, Pittsburgh, October 5-7, 1920.

THE NEED FOR CAPABLE ANESTHETISTS

There is great need of more capable nitrous oxid-oxygen anesthetists, not only in the dental field, but in the field of general surgery, that humanity may benefit by this most valuable anesthetic.

Men of the professions in rapidly increasing numbers are beginning the use of nitrous oxid, many with insufficient preparation. These are dependent upon such as the members of this organization for their training. The burden is upon us. The more we can simplify and standardize technic, the more rapidly we can teach them, and the more will the public be safeguarded. To my knowledge there is little or no opportunity for this ever-increasing number to secure the prolonged training and experience, under supervision, necessary to make of them expert anesthetists. The best we can hope to do is to give them a foundation upon which to build, advising them to avoid the more difficult subjects until knowledge has been gained through experience.

THE EVOLUTION OF STANDARDIZED INDUCTION

If it is practicable to simplify and standardize a technic for administering nitrous oxid-oxygen, necessitating the minimum deviation to accommodate exceptional cases or unusual conditions, then a long felt want has been met.

With this idea in mind I conducted experiments, ending March, 1919, in approximately 4,500 cases, to determine the comparative susceptibility of patients. Since that date the findings have been verified by thousands of additional administrations both by myself and others.

A satisfactory dosage for induction having been determined by experimentation, a definite technic for manipulating the apparatus was rigidly adhered to, and the anesthesia induction was timed by a stop watch. Then with all elements standardized, any variation in results was evidently due to variation in the susceptibility of the patient.

In selecting the dosage, the aim was to procure a comfortable induction and a distributed anesthesia in as short a time as practicable. Anesthesia should not be induced too rapidly. For instance, were we to administer pure nitrous oxid from the beginning, without dilution with oxygen or air, it acts so rapidly that the first nerve centers, with which it comes in contact, might become anesthetized before there was time for general distribution of the gas and the patient might show pronounced symptoms before complete anesthesia was actually accomplished. If operated upon the patient might feel pain. Anesthesia so quickly induced is not well established and is difficult to maintain while operating in the mouth.

EXPERIMENTAL DATA

The dosage used in the experiment was nitrous oxid 95 per cent. and oxygen 5 per cent., administered for one minute, followed by pure nitrous oxid until the depth of anesthesia was obtained, usually indicated by the ashen hue of the face and slight twitching of the eyelid, which is the beginning of anoxemia and jactitation. Then oxygen was again added. All anesthesias were for oral operations and were carried to the stated depth to allow latitude for maintaining anesthesia with the mouth open. The dosage is not intended to apply to anesthesia for major surgical operations. For extra-oral operations, where both the mouth and nose may remain covered to exclude all air, a much lighter anesthesia can be easily maintained. Light anesthesia should be more slowly induced to allow time for better distribution of the gases.

Accurate records were kept of the induction of 2,044 consecutive anesthesias. Of this number 1,828 (or approximately 90 per cent.) responded uniformly to the common dose, were classed as *normal* and divided according to age as follows: 1,715 adults were anesthetized in 1 minute and 40 seconds; 43 children, aged 10 to 15 years, were anesthetized in 1 minute and 35 seconds; 70 children, aged 10 years or under, were anesthetized in 1 minute and 30 seconds.

The remaining 10 per cent. of patients required 5 to 20 seconds longer induction and were classed as *abnormal.* By observations made and the histories obtained they were divided into three types as follows: *Athletes* 67 (robust individuals more resistant to anesthetic influence); *stimulated* 113 (habitual users of alcohol or narcotics); *excitable* 19 (the nervous or hysterical type). Seventeen apparently normal individuals varied from the common dosage as follows: 9 were anesthetized in 1 minute and 50 seconds; 3 in 1 minute and 35 seconds; 1 rapid breather was anesthetized in 1 minute and 35 seconds; 1 shallow breather and 1 shell-shocked soldier, who were anesthetized in 1 minute and 50 seconds; and 2 children, aged 10 to 15 years, anesthetized in 1 minute and 30 seconds.

NORMAL AND ABNORMAL SUSCEPTIBILITY

As previously stated it has been the general opinion that patients vary greatly in susceptiblity to gas anesthesia, and that each one is a law unto himself. Abnormal patients constituting 10 per cent., do vary from normal in susceptibility, some quite markedly; but normal individuals, constituting 90 per cent., are so nearly uniform in susceptibility that they respond quite similarly to a common dose.

Do not understand me to recommend that the timing of the induction is to displace the observance of symptoms. The abnormals are to be reckoned with. Any variation in technic may also change the time of induction. A thorough knowledge of symptoms is imperative, and that they must, at all times, be observed and heeded is of paramount importance.

Timing furnishes the cue as to when anesthesia symptoms should appear. From the data given you will notice that in only three adults, or one in 700, was the time of induction less than one minute and forty seconds, and in these three cases the induction period was only five seconds less than normal. Doubtless the induction could have been prolonged five seconds without harmful results. Only one in ten required longer than normal induction.

THE STANDARDIZED TECHNIC

It would seem practical then to instruct the beginner to follow a definite routine technic for manipulating his apparatus during the induction. With uniform dosage administered anesthesia symptoms may be expected to appear at a definite time. In no case should the induction be carried beyond a certain time limit. It is exceedingly dangerous to attempt to put the extreme stimulated types of patients into *quiet* anesthesia. Using the described dosage the time limit for induction has been set at two minutes.

When anesthesia is established 5 per cent. of oxygen is added and this mixture is increased in volume to force it through the nose. This amount of oxygen, plus the air usually inhaled through the mouth while operating, is sufficient to carry the majority of patients through an ordinary dental operation without necessitating changes in mixture or volume. When indicated, changes in oxygen percentage are made.

EVALUATING SYMPTOMS

The beginner usually finds difficulty in recognizing symptoms of complete anesthesia. Early appearance of any one symptom such as cyanosis, jactitation or stertor, is sometimes misleading. Cyanosis of some degree is a necessary accompaniment to nitrous oxid anesthesia. When nitrous oxid enters the blood stream it displaces oxygen. Therefore the blood is blue in proportion to the oxygen displaced. Since normal individuals when anesthetized have absorbed practically an equal amount of nitrous oxid, it is reasonable to presume that there is a correspondingly uniformity of blueness of the blood. The extent to which this blueness is evident depends upon the complexion of the patient. Individuals with fair, thin skin, rosy cheeks or florid complexion, show the color of the blood more vividly and sometimes display cyanosis before completely anesthetized. Because of these premature symptoms the beginner often operates too soon and the patient suffers pain or develops excitement or both. The common error of beginners is to operate in an anesthesia too light to be maintained or to control the patient.

Timing assists in judging the maturity of symptoms.

Since conducting these experiments I have practiced and taught this method with good results. The beginner is furnished with a routine technic which he readily acquires.

The *experienced* anesthetist may have his own ideas as to what constitutes a desirable dosage or resulting anesthesia. But whatever his belief as to proportion of gases in the mixture, time for induction or depth of anesthesia, he will obtain more uniform results by following a standardized technic for the induction.

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616 Donaldson Bldg.

VINCENT'S GINGIVITIS*

BY O. W. LILLY, D.D.S., WELCH, W. VA.
ORAL SURGEON MCDOWELL COUNTY DENTAL CLINIC

SINCE THE FOUNDING of the McDowell County Dental Clinic which provides for the treatment of all dental diseases, free of charge, among the school children up to sixteen years of age, some ten or twelve cases of an infectious disease affecting the gums and mucous membranes of the mouth have presented for treatment at the Clinic

The history of this disease dates back for centuries, but it was not until the late war, when the disease became so prevalent among the soldiers in the camps and trenches, that the medical and dental professions gave it very serious consideration. Hence its new name, *Trench Mouth.* But after scientific investigations as to its cause had been made, the very proper and scientific name of Vincent's Stomatitis was applied. When confined to the throat only, it is commonly known as Vincent's Angina.

The causes of this disease may be properly divided into: Predisposing Causes and Exciting Causes.

1. The predisposing causes are, *the habitually unsanitary and neglected mouth,* unclean tooth brushes, faulty, unsanitary crowns and bridges, defective fillings, malocclusion, malposed and impacted teeth, pockets and gum flaps over and about erupting wisdom teeth, broken off and decayed teeth, and the accumulation of tartar and accretions about the necks of the teeth.

2. Unhygienic and unsanitary home surroundings, filthy water supply, depleted vitality from long recovery from any sickness or surgical wounds; *syphilis,* metal poisoning, such as the continued use of the drug mercury, faulty diet and personal neglect.

The exciting cause is the Vincent's spirochætes, and the fusiform bacilli. (The spirochætes very closely resembles and is hard to differentiate from the spirochætæ pallida, the specific germ of syphilis).

Many cases are reported in which the patient affected with Vincent's Stomatitis was examined with the Wassermann Test and showed a slightly positive reaction; and with the elimination of the stomatitis the Wassermann test was negative. The spirochætes of Vincent's Angina are found in normal mouths at times, and all factors conducive to the lowering of the vitality of the membranes of the mouth predispose to Vincent's Stomatitis

As applied to the teeth and their investing tissues, and for convenience of description, the symptoms and progress of the disease will be divided into—*First,* Gingival stage; *Second,* Peridental stage; and *Third,* Periosteal stage.

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*Read before the West Virginia State Dental Society, April, 1921.

In the gingival stage the gingivæ only is affected, and is seen to present an ulcerated surface covered with a grayish pseudomembrane. Upon removal of this membrane with a spray or swab a raw, sensitive, bleeding surface is uncovered. Very little discomfort is noticed by the patient except when food or tooth brush is brought into contact with the ulcers.

In the peridental stage the teeth are noticed to become slightly loosened, appear elongated and are sore; the patient finds difficulty in masticating food. The gums are extremely sensitive, bleed at the slightest touch, and are seen to be detached from the necks of the teeth. The flow of saliva is free, a fetor of breath is noticed and the cervical lymph glands are seen to become enlarged. The characteristic gray membrane is also noticed about the gingivæ and gums.

In the periosteal stage the systemic effect is noticed, and the patient presents the symptoms of general septic poison. The pulse is rapid and a temperature of 101 may be present, especially in children. An acute anemic condition is present. The tongue is coated and the patient has a feeling of general malaise.

Deep pockets appear about the roots of the teeth, the teeth become very loose and sore. The gingivæ and necks of the teeth are covered with a yellow necrotic exudate. The fetor of breath is more pronounced. The patient experiences a general uneasiness and pain about all affected teeth. The bone and investing tissues of the teeth may become so necrosed that the loss of the teeth is necessitated. The cervical lymph glands are enlarged and tender.

The ulcers of Vincent's Stomatitis are apt to affect the mucous membrane of the mouth and throat at any point, particularly the mucous membrane of the cheek that lies in contact with the gingivæ.

When the throat is affected it may be differentiated from diphtheria by the fact that the false membrane easily can be removed with a swab.

The progress of Vincent's Stomatitis is very rapid, five or ten days only being required for the disease to advance into the peridental stage.

When a case presents to the dentist for treatment, it should receive prompt and serious consideration.

The patient should be informed of the infective nature of the disease and the possibility of transmission to other members of the family or associates, and should be instructed as to the use of individual linens, drinking cups, etc. In all suspicious cases a Wassermann test should be made as a means of determining whether the condition is a true Vincent's Stomatitis or syphilis.

The use of the tooth brush should be discontinued to prevent carrying the infection to the healthy gingivæ.

The dentist when applying local treatment to these cases should exercise extreme precaution to prevent infecting himself and the possibility of infecting other patients. Rubber gloves should be worn and the bracket or operating table should be covered with three or four paper napkins which can be destroyed when the treatment is through.

For treatment the various antiseptic mouth washes are of value, such as solution of permanganate of potash, listerine and peroxid of hydrogen, and a 10% solution of chlorate of potash; but by far the best results have been attained by the writer by the use of Fowler's Solution (liquor potassii arsenitis) both as local application and as a mouth wash. The method of local application consists in the drying of the gums and affected surfaces as thoroughly as possible by means of cotton rolls and absorbent cotton, and applying the solution freely by means of cotton pellets. A sufficient quantity of the solution should be poured from the bottle into a suitable medicine dish before beginning the treatment. As a mouth wash, one teaspoonful of the solution to one-third glass water is recommended to be used four times daily. A wash consisting of 0.6 grams neo arsphenamine (a trade name of salvarsan), dissolved in half-pint distilled water, produces about the same results as the Fowler's Solution.

The above treatment should be kept up daily and for several days after visible symptoms of the disease have disappeared. In all neglected cases, whether showing a positive Wassermann or not, the intravenous injection of salvarsan is recommended.

Cases when seen within four or five days after their occurrence can be cured within a few days by the use of Fowler's Solution alone or combined with salvarsan, but neglected cases may require weeks or even months to effect a cure.

PRESIDENT'S ADDRESS*

BY DR. J. N. MAHAN, CHARLESTON, W. VA.

THE CUSTOM OF DELIVERING an address by the retiring president cannot be omitted without good and sufficient reasons. This is my apology for taking your time to listen to this paper.

The majority of this body is made up of young men, just entering the profession, or who, at least have not been practicing a great many years, and know little or nothing of the trials and obstacles that the older dentists had to contend with; and as the average dentist is so busy and has so little time for reading the history of his profession, I thought I would write down a few thoughts that intrude themselves on my mind, not with any attempt at originality of matter, but to refresh the minds of some and possibly instruct others; and if I succeed I will not have written this in vain.

When in the economy of nature our services were first required there is no record. Esculapius, the third son of Arsippus, according to

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*Read before the West Virginia State Dental Society, Bluefield, April 11-14, 1921.

Greek mythology, was the first to teach the art of the extraction of teeth, but by what manner is not known. Recent researches in archeology lead us to believe that the Egyptians were familar with the art of filling teeth with gold. The Etruscans, in Italy, early in the Christian era, possessed the art of hiding the solder-line in gold work, as shown by recent discoveries in their crude attempts at dental bridge-work. The Chinese, who claim to have forgotten more than was ever known outside of China, practiced the dental art thousands of years ago; but the real progress in dentistry that entitles it to a rating as a profession has been made in the last few generations.

In the prosthetic department there has been great progress in casting and in removable bridges; but in crowning there has been no improvement over the Richmond. In selecting teeth for his cases it has been made much easier for the dentist by standardizing shapes and shades.

In operative dentistry we have been retromingent, and have been using materials more tractable and less permanent than gold; but on the whole I can truthfully say we are forging ahead.

The systematizing of the work in the schools by the dental hygienist and the care given the teeth during the formative period is just beginning to be recognized, and will continue to grow in public estimation as the benefits are made more apparent.

The introduction of the theory of focal infection into the practice of medicine and the conclusive proof of its existence by the aid of the X-ray, in conjunction with our knowledge of clinical conditions of the oral cavity properly observed has enabled us to produce results little short of miracles in the restoration to health of the patients entrusted to our care; and in the treatment of all such cases we must impress the physician with our ability to handle them scientifically and in so doing establish ourselves in his estimation.

And in closing this paper I desire to thank my brother officers and the committees who have so ably and efficiently performed the duties allotted to them; and as we wend our way homeward, the memory of the pleasant company of comrades inspired by a like pleasure over a similar calling—the labor, the holiday, and the feast—should make us long for the day when we can meet again.

STRUCTURAL CHANGES WITHIN THE PULP CANALS OF TEETH FOLLOWING PARTIAL PULP REMOVAL

BY WALLACE CLYDE DAVIS, B. SC., M. D., D. D. S., LINCOLN, NEB.

(Continued from page 658 August DENTAL SUMMARY)

The foregoing illustrations are sufficient to indicate that which has taken place under the conditions as given in the case histories. Brooks[17] writes on amputations, "First periosteal, then myelogenous callus forms in an entirely analogous manner which results in closure of the open medullary canal." There is a striking similarity in the closure of the tooth's pulp canal when an amputated stump of the pulp is left in the canal and the closure of the medullary canal following amputation of long bones.

There is very little in common, histologically, between the medullary tissue and pulp tissue. However, in the case of construction and repair of the hard tissue in which each is found, there seems to be much of a similarity in physiological action.

Following amputation of the pulp at any point above the bulbous portion, there is deposited in the wound, pulp callus (sometimes spoken of as calcoglobulin) resulting in a permanent unorganized deposit. This deposit is not attached to the walls of the canal, and is easily dislodged in the process of preparation, even when imbedded in paraffin and the grinding method is used.

In case the partial canal filling is placed in contact with the wounded pulp (which is generally the case when using varnish) the portion of the pulp next to the wound is infiltrated with lime salts. The uppermost portion of this pulp tissue is not completely transformed but sections show a mixture of connective tissue and calcic material. This is shown in *Figure 70à*. However, in some cases even this portion of the pulp is fully calcified. (*See Figures 33 and 34.*)

In the formation of this osteoid tissue in the pulp canal the last steps of the formation of true bone never are taken; that is, the formation of arterial loops in this calcic material does not occur. The initial steps in the formation of bone are analogous to those taken in the repair of medullary tissue.

In some cases calcic tissue has been formed in close contact with the canal filling. This may be adventitious dentin, osteoid tissue, or both in combination.

The building of dentin soon ceases, as there seems to be an early disappearance of the odontoblasts. This osteoid tissue is laid down in an orderly manner as soon as the odontoblasts cease to function. The pulp seems to undergo a rapid change in its cell elements and there seems to form a membrane on the periphery of the pulp analogous to the endosteum. This is well illustrated in *Figure 52a*.

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[17] Brooks, Henry T.; "General and Special Pathology," 906.

Relative to medullary repair, McFarland[18] writes, "The cells of the endosteum begin to proliferate and form a rather dense tissue suggestive of the early stages of a cicatrix. Instead of becoming fibroblast they are osteoblast, and instead of a fibrous scar, they form bone."

"The primary formation is an osteoid tissue partly repaired through the intermediate hyaline cartilage. The osteoblasts surrounding themselves with chondrous substance which later calcifies. This osteoid tissue is known clinicly as callus or provisional callus. It differs from bone in that it is without Haversian systems and is not distinctly laminated."

This osteoid tissue formed following pulpotomy is without Haversian canals, which it would seem is due to environment. After this tissue is formed, the blood stream is completely cut off and the last stage in the formation of true bone does not take place.

Dr. McCullom[19] in his text-book of Pathology says, "In fractures the bone ends are at first surrounded by a hemorrhage; but after the escape of blood from the bone-marrow is stopped by clotting, regeneration and healing begin through the proliferation of new tissue from the periosteum and endosteum. These produce a callus which flows in between the repaired ends of the bone as the intermediary callus. It consists at first of cartilage and osteoid tissue; that is, tissue with homogeneous ground substance enclosing the newly-formed cells and having the form of bone without being calcified. This osteoid tissue may be laid down as a solid layer on the surface of the old bone, or through the guiding action of blood-vessels, assume a spongy form. Solid newly-formed tissue of this kind may be transformed later into spongy bone by the invasion of blood-vessels, that in turn become compact in later growth."

In ossification of the tooth's pulp this last step, that is, the invasion of this temporary osteoid tissue by blood-vessels, does not seem to take place. All of the other steps in the repair of medullary tissue seem to occur in the repair of the traumatised dental pulp. It would seem that constitutional diseases, movement at the seat of repair, lack of circulation, or the presence of certain forms of infection would hinder, prolong or prevent pulp repair, to as great a degree at least as in the case of medullary repair. However, it would seem that as much may be expected in the way of repair upon the part of the remaining portion of an amputated pulp as is expected of the medulla in the case of bone amputation.

This process by which an adult tissue is changed into another closely related without the intervention of a granulation-tissue stage is common.

Dr. Ernst Ziegler[20] writes, "Tissue metaplasia is that process by which a tissue already formed is changed into another closely related without the intervention of a cellular embryonic or granulation-tissue stage. Tissue metaplasias play a very important role in the development of the individual connective-tissue formations, particularly in the formation of bone, cartilage, and marrow-tissue. Through proliferation of the periosteum or endosteum often there is first produced ordinary fibrillated connective tissue which later undergoes a transformation into osteoid tissue, bone, or cartilage. In the case of metaplasia of connective tissue into osteoid tissue there occurs without further cell proliferation a condensation of the ground substance which leads by a gradual transformation to the formation of an osseous ground substance staining red with carmine or eosin or fuchsin. Should there further occur a deposit of lime salts, true bony trabeculæ may be formed."

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[18] McFarland, Joseph; "Text-Book of Pathology," 137.

[19] McCullom, W. G.; "A Text-Book of Pathology," 192.

[20] Ziegler, Ernst; "General Pathology," Edition XI., 314.

In no case was it found that the foramina closed when arsenic had been used to complete devitalization, or where the canal had a history of having been flooded with medicines or chemicals which destroy tissues.

In no case was it found that the foramina closed when the root filling had been placed to or beyond the dento-cemental junction.

The building of osteoid tissue with partial or complete closure of the canal occurred when the pulp had been amputated at any point between the floor of the pulp chamber and the dento-cemental junction in the canal.

In all cases of pulp repair of an osteoid nature, the bulbous portion of the pulp had been amputated.

Most pulps, or portions of pulps had been removed under an anesthetic, either local or general.

Youth seems to be more favorable for this repair, yet it occurs but more slowly in those advancing in years.

It would seem that the larger the pulp canal the more quickly does repair begin and the more complete is the closure.

The material with which the pulp canal is filled seems to be of little consequence, provided the material does not act as an irritant.

In no instance was it found that the pulp stump had remained vital or that the construction of osteoid tissue had taken place when an attempt had been made to mummify the pulp.

It would seem that no medicines of a destructive or even of an irritant nature may be used with the expectation of repair.

It would seem that the great damage which has been done to the teeth and adjacent tissues and secondarily to the public health, has been caused primarily by three factors, separately or collectively.

First, the destruction of pulp and periapical tissues through the use of poisonous drugs.

Second, the attempt to practice the complete removal of the pulp, "Pulpectomy" which is a physical and mechanical impossibility in about 98% of the pulp canals, due to multiforamina.

Third, and most important is infection. The infection may be primary, or it may be secondary when the devitalized and unremoved tissue becomes invaded by bacteria.

It therefore follows: since bacteria are liable to infect dead tissue, and since it is impossible to remove the entire pulp from most roots, that pulp devitalization and attempts at pulpectomy are contraindicated.

CONCLUSIONS

First, that in the light of present evidence it would seem that, in case the tooth's pulp is amputated at any point between the bulbous portion and the dento-cemental junction it will, in the absence of gross infection and destructive drugs, remain vital and undergo a tissue metaplasia which sometimes continues to the complete obliteration of the pulp.

Second, that it is necessary to leave the apical portion of the vital pulp *in situ* if closure of the canal or foramina is to be expected.

BIBLIOGRAPHY

[1] Branch, I. B.; "News Letter," Journal Dental Cosmos, IV. (1851), 214.
[2] Tomes, Charles S.; "A System of Surgery," Second Edition, 469. (Foot note [1].)
[3] Cadman, W. W.; "News Letter," Journal Dental Cosmos, IV. (1851), 90.
[4] Chase, Henry S., Journal Dental Cosmos, X. (1868), 17.
[5] Salter, S. J. A.; "Dental Pathology and Surgery," (1874), 71.
[6] Caush, D. E.; Journal World's Columbian Dental Congress, I. (1893), 114.
[7] Groves, Carl J.; Journal National Dental Association, No. 8, VI. (1916), 669.
[8] Hopewell-Smith, Arthur; "The Histology and Patho-Histology of the Teeth and Associated Parts," (1903), 474. Reproduced in Second Edition I., 174.
[9] Hopewell-Smith, Arthur; "The Histology and Patho-Histology of the Teeth and Associated Parts," II. (1914), 94.
[10] Hopewell-Smith, Arthur; Journal Dental Research, II. No. 1, (1920), 59.
[11] Fletcher, M. H.; DENTAL SUMMARY, XXXI., No. 9 (1911), 601.
[12] Groves, Carl J.; Journal National Dental Association, IX. (1919), 763-770.
[13] "Calcification of Pulps," Journal Dental Cosmos, II. (1861), 671-680.
[14] "Calcification of Pulps," Journal Dental Cosmos, X. (1868), 513-515.
[15] "Ossified Pulp," Journal Dental Cosmos, XV. (1873), 162-169.
[16] "Secondary Calcification of the Pulp," LIV. (1812), 157-169.
[17] Brooks, Henry T.; "General and Special Pathology," 906.
[18] McFarland, Joseph; "Text-Book of Pathology," 137.
[19] McCullom, W. G.; "A Text-Book of Pathology," 192.
[20] Ziegler, Ernst; "General Pathology," Edition XI., 314.

No power endures,
No unalloyed success,
Bought at the price
Of anyone's distress.

FUNDAMENTALS OF OPERATIVE DENTISTRY

BY W. H. O. McGEHEE, M. D., D. D. S., CLEVELAND, OHIO

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DISEASES OF THE PERIDENTAL MEMBRANE

CLASSIFICATION—GENERAL CONSIDERATIONS—NON-SEPTIC PERICEMENTITIS—TRAUMATIC PERICEMENTITIS ACUTE SEPTIC APICAL PERICEMENTITIS

DISEASES of the pericementum may be classified from several standpoints. Three classifications are herewith offered:

First, septic and non-septic (classification according to cause).
Second, acute and chronic (time classification).
Third, localized and general (classification according to extent).
Fourth, Black's classification (classification according to locality), viz.:

A Diseases of the pericementum beginning at the apex.
B Diseases of the percementum beginning at the gum margin.
C Diseases of the pericementum beginning at some intermediate portion of the root.

GENERAL CONSIDERATIONS

The pericementum possesses a number of important functions, among which may be mentioned the following:

First, it is the formative structure for the cementum.
Second, it is the organ of nourishment for the cementum.
Third, it acts as a ligament, binding the tooth in its socket.
Fourth, it is the tactile organ for the tooth.
Fifth, it acts as a cushion against the stresses of mastication.

The pericementum becomes thinner with age, while the cementum has a tendency to become thicker, through the formation of successive aminæ of cemental depositions. Since it is one of the terminal parts of the body, and far removed from the heart, the pumping organ, it is especially subject to degenerative tendencies. Owing to its large blood and lymphatic supply, it is also notably subject to inflammatory disturbances, which are quite likely to lead to suppurative conditions in the presence of infection. Diseases of this membrane readily spread to the overlying gum tissues, and *vice versa,* owing to their collateral circulatory connections. Inflammatory disturbances of the pericementum often cause a thickening of the membrane and a weakening of the attachment of the tooth, resulting in protrusion and looseness. As has been mentioned previously, the pulp has no sense of location because of the lack of tactile nerve endings. The pericementum, since it is richly endowed with terminal nerve endings of this type, acts as the touch organ, with the result that pressure on the tooth is immediately transmitted in this way and thus definitely located.

A general differential diagnosis between affections of the pericementum and pulp disturbances is herewith offered:

Diseases of the pulp are characterized by:

First, response to thermal stimuli.
Second, reflected pains.
Third, no tenderness on percussion, unless the pericementum be involved.

Diseases of the pericementum are characterized by:

First, localized pains.
Second, tenderness on percussion.
Third, a dull percussion note, due to thickening of the membrane.
Fourth, protrusion and looseness of the teeth.
Fifth, deepening of the overlying gum color.
Sixth, no response to thermal stimuli, *per se*.

NON-SEPTIC PERICEMENTITIS

Synonyms: traumatic pericementitis, ordinary pericementitis, nonsuppurative pericementoclasia.

547. Mention the *Causes of Non-Septic Pericementitis.*

The causes are largely of a non-septic nature, although septic conditions also may be concerned. However, cases due to septic causes, if continued, will naturally be likely to be transformed at any time into a septic pericementitis. The causes may be mentioned as follows:

First, drug irritants. Cocain, novocain, arsenic, caustic alkalies, strong acids and escharotics when carried through the apical foramen; also mercury when taken internally, the pericementum being especially susceptible to the irritating effects of this drug.

Second, mechanical irritants. Imperfect canal fillings, protruding or otherwise; passage of instruments through the apex; protruding broken broaches; ill-fitting partial plates, crowns, and bridges; excessive malleting of fillings; injudicious regulating of the teeth; faulty occlusion from overfull fillings and crowns, or any other cause; lack of occlusion from improperly-restored occlusal restorations or loss of antagonists; accumulations of calculus; blows on the teeth; habits, such as nut cracking and thread biting.

Pericementitis from cocain, novocain and arsenic may be due to true drug action or to improper methods in handling. Phenol, volatile oils, sodium dioxid, sulphuric acid, zinc chlorid, and similar agents, carelessly handled in a root canal, may produce marked irritation of the tissues of the apical space. The forcing of air or root fillings into the tissues, the careless wounding of the parts, by the passage of broaches through the apical foramen, imperfect filling of the apical third of the canal, the sealing of treatments with temporary stopping on occlusal surfaces, these acting as an elastic cushion, are all frequent additional causes.

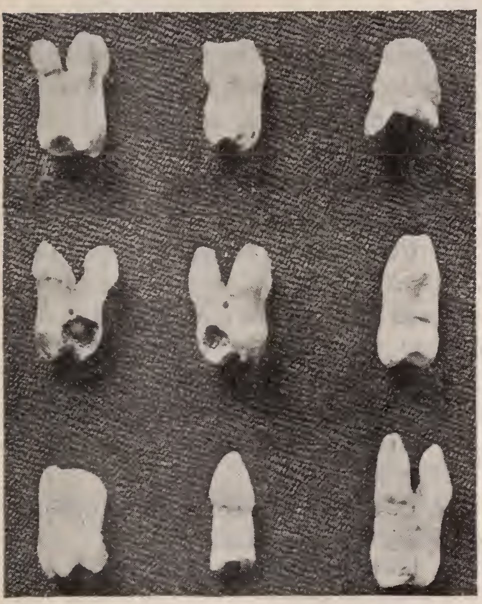

Fig. 280

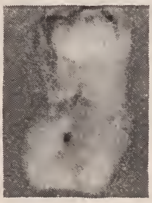

Fig. 281

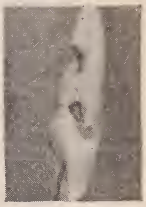

Fig. 282

Fig. 280—Hypercementosis.

Fig. 281—Hypercementosis on a molar.

Fig. 282—A marked case of resorption of the root of a lateral.

548. What are the *Symptoms and Diagnosis* of the condition?

The condition may be located in the tissues of the apical space or on some lateral aspect of the root, depending on the nature of the cause. Tenderness on pressure, protrusion of the tooth, looseness and deepened gum color are frequent. If from drugs used in canal work, these symptoms usually are temporary, though occasionally this is not so, especially if due to arsenic or pressure anesthesia. Malocclusion may be detected by occlusion-marks on fillings, or by carbon paper. A history of the case is valuable in making a diagnosis. The radiograph is of assistance in detecting protruding root fillings and similar conditions. Over-use, misuse, or disuse of the teeth, as well as other causes long continued, are likely to result finally in degeneration and loss of tone in the affected pericementum. Mild cases of non-septic pericementitis, long continued, occasionally lead to hypercementosis (*Figs. 280 and 281*), or to resorptions of the root. (*Fig. 282*).

549. Describe the *Treatment of Non-septic Pericementitis.*

First, remove the cause. A correct diagnosis is important. A root filling usually should not be removed if the operator is sure it is perfectly placed. Relieve excessive occlusion by grinding, or supplying missing teeth. Remove ill-fitting crowns, bridges and plates and supply properly-fitting appliances.

Second, physiological rest often is indicated. Instruct the patient temporarily to avoid chewing on the affected tooth, or where indicated, ligate the affected tooth to its neighbors, or swage a metallic splint and fit it over the adjoining teeth, to relieve the stress.

Third, relieve pain. If the canal is open or has been opened, sedative applications may be used in it, such as eugenol, camphophenique, phenol compound, thymophen, tincture of aconite in chloroform. Volatilization of clove oil by means of heat from the chip blower or hot air syringe through the canal into the apical tissues, after Buckley's method, occasionally will prove serviceable.

Fourth, counterirritation of the gums with tincture of iodin, tincture of aconite, capsicum plasters and similar means is frequently of value.

Fifth, general systemic remedies, such as pediluvia, salines, and similar derivative measures often are valuable.

ACUTE ALVEOLO-DENTAL ABSCESS

Synonyms: Acute alveolar abscess, acute apical abscess, acute septic apical pericementitis, dento-alveolar abscess, alveolo-dental abscess, acute periodontal abscess.

Causes and Patholgy. The causes of this condition are the entrance of pus-forming germs and the escape of the gases and intermediate products from a putrescent pulp into the tissues of the apical space. Lack of aseptic precautions in treating canals, and imperfectly-treated and filled canals also are frequent causative agents. An abscess on an adjoining tooth, or infection from a pyorrhea pocket, also may extend by way of the circulation, or by continuity of tissue, and produce the condition.

As a result of infection, the periapical tissues become subject, first, to arterial hyperæmia, leading into venous hyperæmia and later inflammation of an acute type. Following the inflammatory stage, the tissues of the apical space are broken down and liquefied into pus, through the action of the suppurative and putrefactive germs present. This constitutes the *first or initial stage.* In the *second or perforative stage* the increasing pus formation takes the line of least resistance, and bores its way, in the majority of cases, through the alveolar plate of bone on the labial or buccal aspect of the affected root and into the overlying soft tissues. In the *third stage* the advancing pus perforates the soft tissues, making an opening about one-third of an inch below and slightly to the distal side of the apex of the affected root. In this stage swelling of the soft tissues usually is marked.

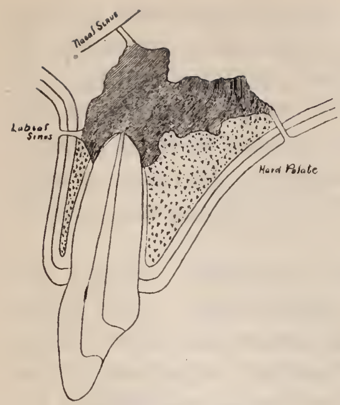

Fig. 283

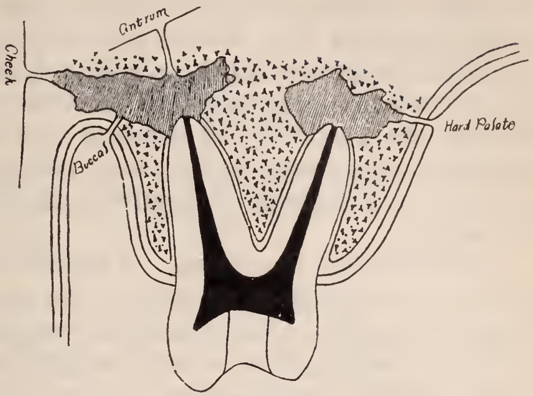

Fig. 284

Fig. 283—Diagrammatic drawing showing most frequent avenues of exit for pus originating in the apical space on an upper central incisor.

Fig. 284—Diagrammatic drawing illustrating the most frequent avenues for exit of pus from abscesses on upper molars.

In other cases, however, the pus, taking easier avenues of escape, will open to the lingual side, in the roof of the mouth, into the nasal cavity, the antrum, the inferior dental canal, the fauces, on the cheek, below the chin, beneath the angle of the jaw, or at far-distant points. (*Figs. 283 and 284*). In cases of open cavities, the pus may find exit by way of the canals, constituting the condition sometimes erroneously designated as *blind abscess*.

During the progress of the condition, the bone and overlying structures are being broken down constantly, liquefied and transformed into pus. After perforation has occurred, the condition remains, if untreated, as a chronic abscess cavity at the root end, with a sinus leading from it to a fistulous opening at the point of exit. If perforation does not occur, as occasionally happens, and the case does not receive treatment, a chronic abscess without fistula is established, the pus draining through the canals or being absorbed into the vascular and lymphatic streams.

Symptoms. The symptoms are both local and constitutional.

Local Symptoms. In the early part of the first stage there may be reflex pains, with slight tenderness on pressure, the latter symptom being occasionally relieved by forcible and prolonged antagonism of the opposing teeth. Later, however, with the increase of the inflammatory disturbance, the pain becomes definitely localized, while during the second or perforative stage it reaches a climax of intensity, with deepening of the local gum color, excessive tenderness on the slightest touch, and protrusion and looseness of the affected tooth. The adjoining teeth also become very tender to percussion. In the third stage, there may be extensive swelling of the soft tissues, with increased protrusion and looseness, extension of the inflammatory area, with great swelling of the cheek or neck, involvement of the eye and cervical glands on the affected side, and other evidences of the progress of the infection toward the surface. Finally, pointing of the abscess occurs and, since pressure is now relieved, the acute symptoms largely subside. A sudden subsidence of the pains and other acute symptoms, in the absence of visible pointing, would indicate the possibility of pointing into some of the internal cavities previously mentioned, or into some obscure locality. In cases of open cavities, with drainage through the canals, the symptoms may not be so marked.

Constitutional Symptoms. Constitutional symptoms always are present, but are more marked in the more diffuse forms with streptococcus infection. The usual systemic manifestations are fever, chills, full, hard, rapid pulse, coated tongue, constipation, weakness, irritability, anorexia and sleeplessness. In the graver forms, especially in the diffuse variety, evidences of septicemia, from great absorption of toxic products into the blood and lymphatics, may occur in the form of soft, frequent pulse, repeated chills, diarrhœa, cold, clammy skin, great depression and disorders of the nervous system.

550. Give a *General Outline of the Treatment.*

The treatment in the main is *Abortive* in character, to prevent the spread of the infection and the continued formation of pus. It is divided into (a), local; and (b), general or systemic treatment.

551. Describe the *Local Treatment.*

Under aseptic precautions, open into the pulp chamber, either through a cavity, old filling, or the lingual, or occlusal surface of undecayed teeth. As soreness usually is present, pressure may be somewhat relieved during the necessary drilling by traction on a ligature tied around the affected tooth, or the use of a modeling-compound splint held in position over several adjoining teeth. The rubber dam should, as a rule, not be applied at the first sitting, owing to the excessive soreness of the tooth. Broach out the canals as well as conditions will admit, to relieve the pressure of the confined gases and allow drainage for pus formation. Flush out with an antiseptic solution, absorb pus from the canals on cotton or paper points, and either (a), pump in an anodyne antiseptic, such as camphophenique, Black's 1-2-3, or phenol compound, leaving the tooth open to allow for drainage, repeating the treatment at intervals of a few hours until relief is secured; or (b), according to Buckley, seal in for a few hours, to be repeated at increasingly longer intervals, formocresol, as in an ordinary treatment for putrescent pulp. In either case, counterirritation to the gum or scarification in the early stages, or, in the later stages, free lancing of the gum, drilling through the bone to the apex of the affected tooth with a spear-point drill or trephine, and the use of a tent for drainage frequently is indicated.

As counterirritants one of the following remedies may be applied, viz.: Tincture of iodin and aconite, equal parts, capsicum plasters, black mustard papers cut to proper size, cantharidal collodion, or one of the following prescriptions:

℞ Mentholis,...gr. XX
Chloroformi, ...ʒ I
Tincturæ Aconiti, q. s., ad ......℥ I (Buckley)

℞ Tincturæ Aconiti, ...ʒ II
Tincturæ Iodi,
Chloroformi, ...aa ʒ I (Buckley)

In some cases, in the later stages, where other methods fail, heat may be applied to the gum in the form of hot water, a split raisin sprinkled with capsicum, or a capsicum plaster, to hasten suppuration and pointing. Antiseptic mouth washes should be used freely.

552. Describe the *Systemic Treatment.*

First, administer alteratives to aid nature in readjusting the parts to a normal condition.

℞ Potassii iodidi,.................................... ʒ Iss
Syrupi sarsaparillæ compositi, ℥ III

Sig. Teaspoonful every two hours until three or four doses have been taken, then three times a day.

Second, saline cathartics, such as epsom salts, seidlitz powders, or citrate of magnesia, to lower the force of the circulation, withdraw blood from the affected area, and enable the system to throw off the toxins being absorbed into the circulation, are useful.

Third, relieve pain and reduce fever by the use of trigemin, acetanilid, phenacetin or, as a last resort, opium or its derivatives.

℞ Pluveris acetanilidi compositi, gr. XV
Ft. Capsulæ No. 3.

Sig. Take one every two hours.

Fourth, a hot mustard foot bath to draw the blood away from the affected area, to the lower extremities is of value.

The prognosis of acute alveolar abscess usually is good, as far as preservation of the tooth is concerned, especially if treatment be applied early. In cases of extreme boggy swelling, great involvement of the tissues of the face, and evidences of extreme septicemic infection, extraction is sometimes the only alternative. In these cases it is frequently a matter of nice judgment to determine whether to extract at once or to use measures to hasten suppuration and pointing, deferring the operation, rather than run the risk of stimulating an increase of the constitutional manifestations and systemic infection, as a result of the operation. In many instances, however, where the indications point to a very grave termination, due to marked septicemia, it will be the part of wisdom to extract immediately under aseptic precautions, curetting and giving the tissues subsequent antiseptic and stimulative treatment.

REPORT OF THE COMMITTEE ON DENTAL SCIENCE AND LITERATURE

CALIFORNIA STATE DENTAL ASSOCIATION
Dr. F. V. Simonton, Sec.
(For The Dental Summary)

DENTAL PATHOLOGY AND HISTOLOGY

By Dr. John A. Marshall

ALTHOUGH THE FIRST TWO PAPERS mentioned below have been abstracted by the section on root-canal technic, the discussion of the subject at the present time appears to warrant a further review from a standpoint other than that of root-canal procedure.

"The Interpretation of X-Ray Pictures of Apical Granulations, Giving Differential Diagnosis of Cases Favorable and Cases Unfavorable for Treatment and Root Canal Fillings." Thomas P. Hinman, D.D.S., F.A.C.D., *Journal of the National Dental Association*, February, 1921, Volume VIII, No. 2, Page 83.

Dr. Hinman emphasizes the necessity for radiograms which are clear and which do not distort the relationship of crown to root. Not only must this correct relationship be maintained, but it is also equally important to obtain radiographic evidence of the condition of the tissue in the apical region. In fact, the course of treatment which is to be followed depends, according to Dr. Hinman, on the classification of bone conditions found by this method.

The next point discussed is the pathology of the "sub-apical" bone. The author states that those cases, which from the standpoint of the radiographic diagnosis, appear to be osteitis of the rarefying type, do not readily yield to treatment. He has found this to be true even when the apical cementum appears normal. He points out that the systemic condition of the patient is sub-normal, in that there is a lowered vital resistance. In conditions showing an apparent condensation of tissue, greater success is obtained and these types constitute the most favorable ones for treatment, and finally, that from four to twelve months are necessary for the complete restoration of the destroyed bone. The teeth which have been treated by the method described, after four years of observation and experiment, have shown no return of symptoms. The paper describes briefly laboratory experiments on the use of ionization. The subject of ionization is reviewed in the paper which follows:

"The Possibilities of the Callahan Method," by Harry B. Johnston, D.D.S, *The Journal of the National Dental Association*, February, 1921, Vol. VIII, No. 2, Page 87.

The author observes that the Callahan Method provides a means of easily and effectively filling and sealing canals and presents as proof, not only radiographic evidence, but also pictures of decalcified teeth showing root canals which have been filled in accordance with the procedure described. In addition to the technic of root-canal filling there are presented case histories showing the results of ionization by means of Churchill's tincture of iodin. Although the solutions are given, no mention is made of the method of applying the current, or of other operative details which are points of interest. The claim is made that "the formation of pus ceased immediately after fifteen minutes' ionization with this solution."

In the discussion by Dr. John P. Buckley and Frederick B. Noyes, the fact is brought out that the men who demand the extraction of pulpless teeth *are those who do not possess a broad knowledge of histology and pathology*. Dr. Noyes drew particular attention to the fact that some statements which he made in San Francisco had been misquoted. He says, "*A pulpless tooth is not a dead tooth*, for the reason that the nutrition of the cementum is not maintained by the dental pulp, although *dentin* loses its nutrition when the pulp is lost." The cementum covers the dentin and possesses an unimpaired vitality, which is maintained by the peridental membrane.

"A Discussion of the Effect of the Ductless Glands on the Teeth," Broderick, *Dental Cosmos*, February, 1921, Pages 135-147. The author points out that the function or rather relation of the internal secretions to dental structures may be summarized thus:

First, that they affect eruption of the teeth.

Second, that they affect calcification previous to eruption.

Third, that they affect calcification after eruption.

Fourth, that they increase the alkalinity of saliva.

Fifth, that they produce a condition of arrested decay.

Sixth, that they maintain the health of the tooth structure.

From these six premises he concludes that pyorrhea is due to a saturation of calcium and is therefore a systemic disease and that caries is an example of the opposite condition, namely: A calcium hunger in which the system needs calcium for metabolic activities.

The particular glands which function in the production of these internal secretions are the suprarenals and the gonads in one section, and the thyroid, parathyroid, pituitary and thymus in the other. It is stated that the removal of the thymus delays the development of the teeth. The *partial* removal of thyroid and parathyroid results in prolonged retention of deciduous teeth, while the *complete* removal results in death from tetany.

If on the contrary, an animal is fed thyroid gland the eruption of the deciduous teeth is hastened. Erdheim has found that when the parathyroids are extirpated from a young rat that the incisor teeth become liable to repeated fracture. The calcification of the dentin ceases, and after the portion already formed has been worn down so that the uncalcified structure is exposed, it is found that it does not possess sufficient strength to withstand the normal stress of mastication. In fact, by actually regulating the time between extirpation of the glands and an examination of the teeth,it is possible to obtain all transitional stages between normal and completely decalcified teeth.

Cook obtained results which were not in entire accord with those above mentioned. He reported that he has not been able to support the work of McCullom concerning calcium metabolism. He attacked the problem by conducting feeding experiments and by making daily analyses of urine and feces. Parathyroidectomy was performed on a number of dogs and the variation in the excretion of calcium and magnesium in the feces and urine noted. Although slight differences in the amount of magnesium excreted were found after this operation, he was unable to demonstrate an appreciable variation in the *calcium* percentage. On sacrifice of the animal, the brain was analyzed and the percentage of calcium determined. These differences were not of sufficient magnitude to indicate that there is any relationship between *calcium content in tetany* and in *normal animals*. This point is mentioned because of the fact that one of the arguments put forth relative to the altered calcium metabolism in parathyroidectomized animals is:

First, in tetany there is a decreased calcium content of the brain.

Second, that there is an increased elimination in the urine.

Third, that tetany is relieved by injections of calcium.

Dr. Cook points out that Berkeley and Beebe have shown that other salts also have a marked effect on tetany, noticeably strontium. Tetany may be controlled by injecting nucleo-proteoids obtained from the parathyroid. There is no doubt however, that a profound influence on metabolism is produced by parathyroidectomy, an influence which does not appear to be concerned entirely with calcium metabolism. He suggests that the tetany following parathyroidectomy is the result of an altered salt equilibrium.

Gies reports experiments on *thymus* which are of interest. A number of rats were thymectomized and later the bones and teeth were examined chemically. Rachitic lesions were observed in thymectomized animals but these lesions were independent of thymectomy. Chemical analyses of bones and teeth showed that those animals who were *moderately* rachitic and those who were *markedly* rachitic contained, in general, *less* calcium than did those of the *non-rachitic* and *slightly* rachitic animals. It was impossible however, to attribute any influence on the progress of calcification of bones and teeth, to the activity of the thymus for the reason that there was an absolute lack of a particular trend of calcium content in the specimens examined.

Klose and Vogt describe experiments on thymectomized dogs in which it was shown that ossification was delayed by the operation. By comparing the ribs of the controls with those of the operated animals, they were found in the one case to be completely ossified, and in the other almost wholly cartilaginous. The chemical examination of these tissues showed that the calcuim content was reduced nearly half in the thymectomized animals.

In spite of the confusion which exists in this field of physiology, a confusion which becomes even more evident, when all of the voluminous literature is reviewed, Dr. Broderick endeavors to explain dental disease on the basis of endocrine function. He gives as an example the following:

After a child suffers an attack of measles the ductless glands function as "toxin eliminators." This increased activity is followed by a reaction period in which the normal in-take and out-put of calcium salts is disturbed. This calcium starvation is evidenced in the saliva, as well as in the other tissues. He believes that the effort is made by the system to overcome this temporary lack of calcium, in that the formed tooth structure may possibly be called upon to yield up its lime salts. With convalescence, the body becomes flooded with this material and "it is now manifestly impossible to recalcify the enamel, as the scaffolding has gone, but the dentin takes up the superfluity of lime and becomes hypercalcified, and an arrested carious tooth is the result."

Upon this hypothesis the author has based "suitable pluriglandural therapy," in which he administered an extract from the anterior lobe of the pituitary body, together with preparations from the suprarenal and the parathyroid glands. These are combined with a small amount of calcium and the author claims to have obtained favorable clinical results.

The paper concludes with the expressed belief that the therapy, as outlined, tends to fix the calcium salts in the tissues, and therefore provides a basis for the treatment of pyorrhea as well as dental caries.

PREVENTIVE DENTISTRY

By Shirley J. Ashby

"Oral Hygiene in Relation to Public Health," (Alfred Fones, D.D.S., Bridgeport, Conn. *The Journal of the National Dental Association*, April, 1920, Page 358).

In this article the author states that dentistry must concentrate on the soft tissues, the gums, pericementum and pulp, as these tissues are chiefly involved in permitting ingress of bacteria into the lymphatics. He believes more teeth are lost from pyorrhea alveolaris than from caries, that inflamed gum tissues and pericemental infections must be eventually considered in the prevention of tuberculosis and that apical infections are the primary foci of secondary infections of heart, kidneys and joints. On account of the prevalence of these conditions, the author points out that the dental profession is unable to cope with the question of oral hygiene and advocates the public school hygienist. He also states that the use of free sugar should be discouraged, assuming that it is the most important of all factors in creating susceptibility to dental caries.

"The necessity for Prophylaxis and Radiology in the Practice of Orthodontia" (F. M. Casto, M.D., D.D.S., Cleveland, Ohio, *The Journal of the National Dental Association*, May, 1920, Page 437).

This article is an appeal to the orthodontist to pay particular attention to prophylactic care of the mouths of children undergoing orthodontic treatment, the early and frequent use of the radiograph, and a most careful watch for incipient dental caries.

"The Mouth as a Gateway of Infection" (Frederick Noyes, A.B., D.D.S, Chicago, Ill., *The Dental Cosmos*, September, 1920, Page 1035).

Dr. Noyes presents mouth conditions of the Filippinos in relation to their longevity; he then treats his subject under the following headings:

1. Systemic conditions originating in the mouth.
2. Caries the primary cause of infection.
3. Preventive dentistry.
4. Prevention of pulp exposures.
5. Systemic infection through the gingival tissues.

The author closes by saying, that the fundamental problem is not what should be done with the pulpless tooth, but how can the exposure of pulps be prevented? In adult life the problem of the dentist is not merely the preservation and maintenance of mastication but the study of the relation of mouth conditions to the health of the individual. From the standpoint of the patient, it is better to lose a tooth and save the patient than to save a tooth and bury the patient.

"Annual Report of the Oral Hygiene Committee for the State of Michigan. (Hertha C. Hartwig, D.D.S., Chairman, Detroit, Mich., *The Journal of the National Dental Association*, January, 1921, Page 31).

This report deals with the work being done in Oral Hygiene at Columbia University, by Dr. Fones in Bridgeport, Conn., in the prophylactic clinic of the Metropolitan Life Insurance Company in New York, and in many other cities and states in the United States, Great Britain, and France.

The State of Michigan is then reported by districts, showing a well organized endeavor to handle this most important question.

"The Prevention of Periodontoclasia" (Pyorrhea Alveolaris), (Arthur H. Merritt, D.D.S., New York, N. Y., *The Dental Cosmos*, Sept., 1920, Page 1051).

Substituting the term periodontolclasia for the "misnomer" pyorrhea alveolaris, Dr. Merritt treats his subject under the following headings:

One, etiology—Causes are various, but mostly local, all of irritative nature. First and most obvious the gingival lesion caused by anything that irritates the gingiva with possibility of subtle changes in the alveolar process and pericementum as a result of occlusal trauma which is defined as an inco-ordination between the inclined planes of the opposing teeth when brought into occlusion.

Two, treatment—Consists of removing from exposed cementum, all calcareous deposits and necrotic pericementum leaving surface of root smooth and free from pits and grooves and the correction of the occlusion.

The treatment of advanced cases should be by trained periodontist but prevention lies in the hands of the general practitioners.

Three, preventive treatment—Must be seriously and systematically undertaken. It includes routine examination of all mouths, removal of all causes of irritation, training of patient in care of mouth, polishing, inspection for traumatic occlusion, defective contact points, and allied defective dental restoration.

Four, patients' part in maintaining oral cleanliness—Dr. Merritt advises and instructs patient in systematic care of the mouth, advocates use of small tooth-brush with shortest bristles at the end, and the proper use of waxed floss silk of suitable width for the case in hand.

Five, Method of brushing the teeth—The principles underlying toothbrushing are given as follows: *First*—simplicity. *Second*—effiicency. *Third*—stimulation of the supporting tissues, and *Fourth*—avoidance of injury to teeth or gums.

IONIZATION AND ROOT-CANAL FILLING*

BY DR. HARRY B. JOHNSON, ATLANTA, GA.

BEFORE I START on reading this paper I simply want to say a few words about how I enjoy being here with you gentlemen. I have been in North Carolina but a very few times, but each time has constituted a great deal of pleasure to me and I appreciate the invitation to come over and read the paper and give a clinic for you.

"Ionization and Root-Canal Filling." Such is the title of my paper as given in your program. To carry their various procedures forward in their logical sequence however, it will be necessary for me to depart somewhat from this title.

The first thing I wish to stress is the incalculable importance to the patient of proper treatment and filling of the canals of every non-vital tooth. This has been brought out very forcefully and frequently by practically all of our recognized leaders, but I will unhesitatingly say that not one per cent. of the members of our profession have as yet, a real or even approximate conception of the absolute necessity for protecting our patients in this respect to the absolute extent of our ability. Most of us appreciate the necessity for disposing of chronic abscesses of the pus-producing type. It is of fully equal importance to dispose of the blind periapical, or alveolar abscess—or to name them more properly—granulomata. Just how important this is, we are now just *beginning* to find out—that is, those of us who keep in the closest possible touch with the few great minds which are daily delving deeper into this great problem. Those who have not the opportunity or the desire to do this, merely know of the existence of such a problem. A more universal and intense interest in this must be generated. Inasmuch as such a tremendous number of the most obscure, and for patient, dentist and physician, most unpleasant ailments with which humanity is afflicted are either primarily or secondarily caused by periapical infective foci, we as dentists owe it to our profession, our patients and to ourselves to delve into this subject with all of our ardor and enthusiasm. If it were possible for each of us to see pass in review before him each of those patients whom our ignorance has deprived of those finer qualities of health and happiness, shortened their periods of usefulness and term of life, what an awakening there would be. Understand I am not laying this to our door as criminal negligence, for the day of knowledge is just now beginning to dawn, but our knowledge is now such that it soon will be criminal negligence if we are not able to inform our patients fully and scientifically of the dangers of non-vital and infected teeth, and be able to treat them properly should the patient so consent.

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*Read before the North Carolina State Dental Society,

Though we are all doubtless more or less familiar in the abstract with most of the derangements caused primarily by these nests of streptococci, let us review them again and possibly add some new ones with which you are not familiar.

Probably the most common is arthritis, or inflammation of one or more joints in one of its numerous forms. How horrible is arthritis deformans in which the joints become enlarged, distorted and ossified—and yet how common? Neuritis, or inflammation of some trunk nerve. The patient's usefulness, efficiency and general physical welfare is destroyed in direct ratio to the severity of this attack.

Endocarditis. This is probably the form which results in more actual mortality than any other secondary form of oral infection. The writer recently heard Dr. Thos. B. Hartzell, of Minneapolis, state that federal statistics prove that heart disease claims more victims annually than tuberculosis and that 90 per cent. of these cases originate from oral foci, including alveolar abscesses, pyorrhea and infected tonsils. Think of it; more people are dying annually from only one of the many forms of disease which originates in the mouth, and which we should be able to diagnose and cure, or cause to be cured, than are dying of the universally dreaded disease, tuberculosis.

To continue with the list, however: we have myocarditis, inflammation of the heart muscle; arteriosclerosis—hardening of the arteries;

iritis; inflammation of the iris of the eye; nephritis, inflammation of the kidneys—and it is now stated by some authorities that some cases of Bright's disease are believed to have been traced to periapical foci. Certain cases of chronic appendicitis have been definitely traced to the same cause, and as definitely cured. Burning or itching rashes on any part of the body, particularly the feet; high blood pressure, low blood pressure, gall stones, bladder ulcers, gastric ulcers, stricture of the ureter, atrophy or hypertrophy of the delicate structures of the inner ear, producing a progressive loss of hearing; tonsilitis and others which I may have overlooked are included in the list. As formidable as this list now is, it is the humble opinion of your essayist (if I may venture a personal opinion) that it will be very heavily added to. If this slow, low grade and insidious type of infection found in periapical foci can cause major lesions of as active and powerful an organ as the heart, what may it not cause either primarily or secondarily. We know that the toxins from these foci are being taken up by the lymphatics every minute of the day and night, resulting in the continuous infection and impoverishment of the blood stream, that great fluid organ from which every other organ, every tissue, every cell must draw its nourishment—its very life.

A case in my own practice recently may (or may not) illustrate this further. Patient, a woman of approximately thirty, married, two children, pronounced blonde. Symptoms, anemia, marked loss of weight, strength and energy. Had been menstruating continuously for about three months. A radiographic examination showed three non-vital teeth, two of them with quite large rarefied areas. All of them were carefully opened, ionized and filled. At the same time that I began treating her, her physician changed his treatment. Thirty days after completion of the dental treatment, she returned for examination and stated that about ten days after treatment was finished, menstruation ceased, and up to that time, she had gained fifteen pounds and was very evidently greatly improved. She again returned thirty days later; physical condition not so good, and stated that she had had some return of the trouble in spite of the medical treatment. I may be wrong but I attribute this to a reinfection. Two of these teeth were so seriously infected that I was very doubtful of being able to save them, but as one was a cuspid, was very anxious to do so. She is soon to return again and if she still shows symptoms of reinfection, extractions will be made followed by a thorough curettage. The fact of the return of her trouble under the same medicinal treatment she was using at the time of her relief leads me to believe that her relapse was due to reinfection of the granulomatous areas. It is only by the careful observance and tabulation of such cases that we shall ever be able to arrive at definite solution of the many problems embraced in this subject.

The problem of opening and filling pulp canals; this is, in the opinion of the essayist, the foundation upon which our results shall abide or fail. Granting that we have gained such access to the focus of infection as will enable us to destroy it, and granting that we have so disentegrated the granulomatous tissue that nature is able to destroy the bacteria (for neither ionization nor any other method we now have does this) if all canals are not perfectly filled, and every foramen sealed, we have no right to expect that tooth to remain immune from future infection. There is no other operation in dentistry that can compare with this in difficulty and delicacy. For bear in mind that we are not dealing with *one* foramen to the canal but with two, three, six, or even eight. Now if it is so important to fill one of these why is it not of equal importance to fill each of the others? A canal may be of microscopic calibre yet be a veritable St. Regis for streptococci. Can these accessory canals be opened? Not more than one or two to the root. Can they be sterilized and filled without being opened? Unquestionably—thanks to that grand old pioneer whose fame will ever increase as the years roll on—Dr. John R. Callahan. It is the opinion of the essayist that the "Callahan method" is, and will remain so for many years, if not for all time, the *only* method whereby *every* canal regardless of size, curves and angles, may be perfectly filled. I have proved that chlororesin is of such a penetrability that it will even penetrate and fill with resin the spaces between the enamel rods. This has been proved on dried teeth which when soaked in chlororesin become so saturated with resin that they can at any time thereafter be cut with the largest cross-cut fissure burs or ground with the coarsest stones without using water, and the enamel will not chip or break. We do not rely on this resin however to fill any but the exceedingly attenuated canals. The other may all be filled with gutta percha—provided we have not enlarged any one foramen so large that under pressure all of our filling material will escape through this one great highway of least resistance. I do not believe that the natural size of any foramen should ever be intentionally increased. Where we have one main apical foramen which is of considerable size—so large that it can be forcibly penetrated by a fine Kerr pulp canal file, we should first *plug* that, then force our chlororesin-percha into the minute accessory canals. It is a grave question if an infected tooth so treated and filled will not be restored to normal by the unaided forces of the body. I have not yet felt justified in experimenting in this on my own patients, but have always ionized before filling.

Let us now get to the real meat of my subject—how to properly open, sterilize and fill pulp canals. Generally speaking, the only canals which are at all difficult to open are those which have contained no pulp for a number of years, or those in which the pulp had been in constant state of irritation for a number of years until deposits of secondary dentin have almost entirely obliterated them. I have frequently found them of a size that could be compared to a single fibre of cotton or silk. That sort is indeed difficult to open and may with safety be done only by constant and long continued use of dilute sulphuric acid, for in those instances no instrument will even detect the canal, much less penetrate it. In opening the average canal, my technic is to place 30 per cent. sulphuric acid in the pulp chamber and begin working in very cautiously and slowly a XX fine Kerr pulp canal file; about a quarter turn and a partial withdrawal constituting each stroke, which very effectively opens, removes debris and carries in the acid. Do not attempt to use any form of reamer, G-G drills or anything whatsoever except a canal file, a smooth broach or a barbed broach at this stage. I have named them in their order of effectiveness. G-G drills may be used for giving the opening a funnel shape but should never be sunk deeper than the length of its head. As long as the point of the file binds slightly at each stroke we know that we are following the true canal, but when it ceases to bind, or hang, good-night—we know that we have either gotten out of the canal into a "blind alley" of our own creation, or we have struck a constriction so small that the needle point of the instrument cannot even feel it. In this case, we withdraw the file and assure ourselves that it is the smallest one we have; then bend the point of it very slightly so that if we have merely gotten out of the canal at some curve in its course, we may find it again with the bent point with which it is much easier to follow a curve than with a straight instrument no matter how flexible it may be. It is my constant practice to keep my files and pathfinders bent to conform to the curves of each canal throughout its entire preparation. It has been my experience that when a canal becomes so attenuated that the point of a XX fine Kerr file will not bind in it at the point, that no pathfinder or other smooth broach will penetrate it. These are cases which require the careful and delicate work to avoid a perforation. We then fill the canal with the 30 per cent. acid and seal it in until one or two days later. (It will do no harm if it stays in much longer). Then open again, neutralize with a saturated solution of common soda, dry and pump in fresh acid; then enter with the file (XX) and very gently try to find the opening to the remainder of the canal. Continue this same treatment from time to time until you will ultimately succeed in passing the constriction no matter how long it may be, and arrive at the true foramen. This is the only type of case (that is, where the construction involves the apical portion of the canal) in which I intentionally pass through the foramen. I believe that where there have been such heavy deposits of secondary dentin, that the accessory canals have been reduced to mere tubuli, or totally obliterated.

In those cases in which we pass with comparative freedom to the apex, we should discard our files just before we reach the foramen. It is usually an easy matter to tell when we are approaching the foramen, for when the point of the instrument is working in cementum it has an entirely different "feel" than when it is in dentin. With a very little training this difference can be easily detected if the thumb and finger are not calloused—and no dentist should allow the skin on his operating finger and thumb to become thick and hard. Keep it soft and sensitive by rubbing with a cake of pumice or sapolio. If the above method fails you, you can resort to the diagnostic wire and the X-ray, or penetrate entirely through with the XX fine probe, or pathfinder, then by comparison with the depth of penetration of your file, you can tell just how far the foramen is from the point of your file. I like for my file to come within one-sixteenth or one-thirty-second of an inch of the main foramen. After you have reached this point with the XX fine file, proceed to enlarge to any size you may desire with successively larger sizes of file, but still carefully avoid enlarging the foramen. Of course in many cases the foramen is larger than your smallest file, and in that case you may clean out the foramen but do not enlarge. I find it just as easy to fill a very small canal if the walls are smooth as it is to fill one the size of a pencil lead.

Of course during all of this process of opening and enlarging, we have been constantly pumping in acid and neutralizing it for the purpose of removing the fillings and other debris.

THE STERILIZATION OF THE CANAL

I never under any circumstances open and fill a canal or canals at one sitting. If they are opened in one sitting I then dry out thoroughly and again flood them with 30 per cent. acid which is sealed in for at least twenty-four hours. This is what sterilizes the canals and tubuli. I consider the use of formocresol, phenol, trichloracetic acid, and other such powerful escharotics contraindicated. Oil of cloves might be used except for the fact that it is not a germicide. When the patient returns for the filling, I dry out (but do not neutralize) the acid with Johnson & Johnson's absorbent points, and if the case is an infected one, we are now ready for our ionization.

Ionization is another of the mysteries of dental treatment. It is used purely empirically. We do not know what it does or how it does it. We do know that it does *not* sterilize. Numerous technical and scientific, and equally abstruse explanations have been offered but their only accomplishment has been to leave us in even greater confusion. Your essayist, after two years of constant daily use, is of the conviction that ionization does produce some beneficent result. The tentative conclusion that I have arrived at is, simply stated, it causes more or less disintegration of the tough granulomatous tissue, somewhat akin to cauterization and inhibits the bacteria present. This produces more ready phagocytosis and autolysis or digestion and absorption of both tissue and bacteria. I would not consider my equipment complete without an ionizing apparatus.

Now having successfully opened and ionized our pulp canals we are ready to fill them.

The first requisite is the absolute dehydration of the canals. It is a physical impossibility to successfully fill and seal any canal which has the slightest trace of moisture in it. Dry out well with absorbent points or cotton, pump 95 per cent. alcohol to the absolute apex, absorb with points or cotton and then hot air in chip blower or hot air syringe dry the canals until you are confident that all of the alcohol has been evaporated. In this way you will dry out even the tubuli to a certain extent so that they will simply drink up your chlororesin. With the canal about half full of this solution, insert your dry and sterile gutta-percha point and begin pumping it back and forth. Continue until the point is entirely dissolved, or shows no further tendency to dissolve. If during this process the patient has given no indication of pain, place in a small home-made but sterile cone of temporary stopping and pack it in with your canal pluggers. Your packing must be somewhat regulated by the known size of your canal and foramen, for in some cases the patient will not show pain even when you have forced a very great excess through the foramen. When you are in doubt as to having plugged the foramen, do not hesitate to use great force in condensing. I frequently use the automatic mallet for this purpose and have after resorted even to the hand mallet. Where these are used, your gold pluggers are the only points which will answer.

When you have finished the canal filling, unless you intend using pins in the canals for retaining your coronal restoration, the pulp chamber should be immediately filled with oxychlorid cement. The radiograph is then taken to prove your work. And by-the-way, set your sights right now to own a radiograph machine. Long before you have retired to the fashionable suburb, or the poor-house as the case may be, they will be as necessary as the dental chair. Take the lead—beat the other fellow to it—and then show him how to use it.

I cannot close without a few strong words on sterility, or asepsis. The rubber dam should *always* be in position, with a clamp to hold it. The tooth, dam and clamp should always be painted with iodin. Only instruments which have been boiled or otherwise sterilized (and kept so) should ever enter a canal. Your cotton or points for drying *must* be sterile and your gutta-percha points should be kept continually in 1-500 solution bichlorid (use the white tablets to prevent discoloration) or 60 per cent. grain alcohol. Finally, just before inserting your filling give your hands the best scrubbing you know how, using a stiff bristle brush, just as though it were your own tooth you were going to fill.

Make capital of these aseptic precautions; let your patient know about them and they will not only appreciate it personally, but will tell others about it.

FROM FAR INDIA

"Richbon" Coonoor, S. India,
June 13, 1921.

TO THE EDITOR OF THE DENTAL SUMMARY:

A long time ago you asked me to write an article or series of articles on, "Dentistry in India" but at the time my experience and my literary ability were very limited, so I did not feel inclined to break into print.

The majority of my patients are European, but during the war I served on the staff of a large Indian hospital and had the opportunity of examining a large number of natives.

The teeth of the Indians, are, on the whole, good; but as the ordinary Indian cleans his teeth with a piece of wood, the interproxinal spaces are not touched; also as many Indians are vegetarians, and others refrain from eating certain foods, I found a great many cases of pyorrhea.

In some cases the accumulation of tartar was so great that the teeth were held in by the tartar, and when removing, all came away together with very little pain.

Occasionally cases presented themselves with abscesses that were discharging on the outside of the face with necrosis of the jaw, the poor Indian not knowing what to do for relief, and in many cases afraid to come to the hospital.

A great many of our good people in America support missionaries in India, maintain hospitals and do other useful work; but as far as I know nobody has sent out a Dental Surgeon, and to the dentist so inclined, who is satisfied with a living, there is a great need of his services, a chance to work in the Great Service, for I feel the large Missionary Boards in America would employ dentists if they could get them on the same terms as they do their physicians.

While speaking about missionaries, I have had the pleasure of examining the teeth of a great number during the past two years, folks from all over the United States. In nearly all cases the enamel fillings, gold fillings and inlays have been good; but the gold crowns, plates and amalgam fillings were disgraceful.

Having been to many dental meetings in spirit through THE SUMMARY, *Cosmos* and *National Dental Ass'n Journal*, I have read of clinics on, "Partial Plates, Nerve Blocking, Gold Inlays, Removable Bridgework, etc.," but very few on gold crowns and none (since the essays by Dr. Crandall) on how to put in good amalgam fillings.

I have seen gold crowns where there was recession of the gums, with rough edges, placed on the teeth, looking far more like tin cans placed on posts by school boys than a useful, healthy, artistic restoration.

I note that a great many dentists are still using amalgam as a filling material. In the majority of cases examined the margins had been badly prepared, the amalgam poorly condensed, the fillings left rough with beautiful food traps at the cervical margins.

My observations lead me to think that many teeth can be saved with amalgam; but why insert a filling that looks like a chunk of mud thrown at a white wall? After removing the decay, it takes very little more time to smooth the margins with one of those little mounted points in the engine (Lee S. Smith & Son still make them), use a matrix, weigh your amalgam and mercury *a la* Crandall, pack it hard, and later polish, and you have something that you are not ashamed to look at in the years to come.

Because a patient comes in that cannot afford a gold inlay or an expensive piece of work, are we as a profession justified in doing a bad amalgam restoration? Is it not better to refuse to do the work than to take less money for bad work, at the same time explaining to the patient your reasons? After all, the patient trusts us and we are for the time, "thy brother's keeper."

Here in the mountains of India there is no electric power nor gas, so in this office we use a small kerosene stove with a white enamel basin with cover for a sterilizer. One of my patients heard the water boiling and, to my surprise, asked, "What is that?" and I explained. Then the patient told me of the number of dentists she had visited in America where there was no sterilizer in the operating room.

While on a visit to America in 1919, I visited many offices without seeing a sterilizer, and I could not help thinking how can men be neglectful of their own interests, for people notice what a man has in his operating room. Are they treating the next patient right? In the position the profession holds today it is nothing short of criminal.

It seems to me that until we put all that we can into this profession of ours we can not say to the great Mayo, "We have arrived."

I have enjoyed your talks very much and when the SUMMARY arrives I always turn to the back end to see what "George" has to say, for after all, the business side of dentistry is the big thing when you start on the road down hill.

I hope that you will rub it in about the points I have mentioned, for common sense must tell us that after all, a dentist charges for his time, and he ought to do nothing but good work regardless of the material used.

I was persuaded to try Martin's Pyorrhea treatment some years ago, and I think that much of it that my chemists in Bangalore, The Medical Supply Co., have sold a great many tins. I think I am the only dentist in India using it. With best wishes.

Yours sincerely,
W. F. Rule

EDITORIAL

THE NATIONAL MEETING

The meeting of the National Dental Association in Milwaukee, Aug. 15th to 19th, 1921, was one of the best yet held.

In the first place the weather was cool, something unusual for the time of year the National convenes, and it added one hundred per cent. to the enjoyment of those in attendance. In the second place the meeting was held in an auditorium adequate to the needs of such a gathering and everything was given in it.

The exhibits occupied the entire basement for their displays. The temporary offices of the Association, rest rooms, the large banquet and clinic hall, and several sectional meeting halls were located on the main floor. The large Plankington Hall and sectional meeting places on the second floor gave ample room for all the gatherings, the most complete and best arranged meeting place ever used by the National. In passing, we might say that the local arrangements committee deserves a word of praise for the faithful performance of their duties.

The first day of the convention was given up to registration of members, meetings of the Board of Trustees and House of Delegates, and meetings of other dental organizations, fraternities and fraternity banquets and golf; Dr. H. D. Grubb, Cleveland, winning the cup given as a trophy in the tournament.

Tuesday morning the first general session was held preceded by a praiseworthy organ recital by Carl Mueller, Milwaukee.

After the invocation by Rev. Noonan, president of Marquette University, Mayor Hoan, of Milwaukee gave the address of welcome on behalf of the city of Milwaukee, and P. A. Grau, secretary of the Association of Commerce, Milwaukee, in a pertinent and witty address put the whole assemblage in good humor.

C. L. Babcock, Milwaukee, gave the address of welcome on behalf of the dental profession of Wisconsin. John P. Buckley, Los Angeles, responded to the address of welcome; W. H. Richards of Knoxville, Tenn., presented the gavel and then H. E. Friesell, of Pittsburgh, president of the National Association, read the president's address which terminated the first session.

The Tuesday afternoon session was taken up by meetings of the various sections in which papers of interest were read and discussed.

The Industrial Dental Surgeons held a meetng at 4:15, and H. M. Brewer, head of the dental department, National Cash Register Co., Dayton, O., presented a motion picture film on the subject of "Health and Sanitation as Practiced at our Factory." Other matters of interest also were given and discussed.

In the evening a silver anniversary banquet of the National Dental Association was given, with Col. J. Hamilton Lewis, of Chicago, former senator from Illinois as the principal after-dinner speaker. His address was splendid, but unfortunately, on account of the vast throng present, many were unable to hear everything distinctly in the spacious hall.

Wednesday morning there were meetings of the various sections and clinics by the Harvard University Dental School Crown and Bridge Club. Wednesday afternoon there were sectional meetings and clinics, group and miscellaneous.

In the evening at the general session C. F. Mueller gave a short organ recital. An address on "Dental Preparedness from Medical Department Viewpoint" was given by Gen. M. W. Ireland, Surgeon-General, U. S. Army, Washington, D.C. This address was full of interest. Among other things the speaker said the department was cooperating in every way possible with the dental section of the army, and that a dental school was being establised in connection with the Walter Reid Army Hospital at Washington.

At the evening session Wallace Seccomb, Toronto, presented the subject of "Physiological Balance—Diet and Mouth Health" and F. J. Conboy, Toronto, gave a paper on "State Dental Service".

Thursday morning and afternoon a few sectional meetings were held but the time was given mainly to clinics. Thursday evening, E. V. McCollum, of Johns Hopkins University, Baltimore, gave a talk on "Scientific Nutrition as a basis of Preventive Dentistry."

Friday morning was devoted wholly to clinics of various kinds. The clinics as given were of unusual interest and reflect great credit on those who had this part of the program in charge.

Altogether it was a great meeting, and those who did not attend missed something worth while. The attendance did not seem as large as at the Boston meeting last year.

During a meeting of the Research Commision it was decided to name the research fund, The Weston A. Price Dental Research Fund,in honor of Dr. Price who did so much to organize and get the research work started. And in this connection it might be interesting to our readers to know that the Research Institute, at Cleveland, which originally cost less than $50,000 has been leased in such a way as to bring a gross return of one million, fifty seven thousand dollars to the research fund. The rental is $4,500 per year for the first five years; $5,600 per year for the next five years; $9,000 per year for the next five years, and $11,300 per year thereafter during the ninety-nine year term of the lease. It will, however, take the first five or six year's receipts to pay off the balance of a mortgage on the property. For the present, at least, the research work of the National will be carried on in various dental Colleges where equipment is adequate.

Officers of the National for the ensuing year are: T. B. Hartzell, Minneapolis, president; J. P. Buckley, Los Angeles, president-elect; W. R. Wright, Jackson, Miss., vice-president; D. D. Campbell, Kansas City, Mo., vice-president; Otto U. King, Chicago, was re-elected secretary; A. R. Melendy, Knoxville, Tenn., re-elected treasurer.

New members Board of Trustees are: C. C. Allen, Kansas City, replacing C. L. White; R. H. Volland, Iowa City, replacing F. H. Orton; J. D. Milliken, San Francisco, re-elected.

The next meeting will be held in Los Angeles, California, in July 1922. Date not yet definitely announced.

Michigan Dental Examination

The next examination for candidates wishing to practice Dentistry in Michigan will be held in Ann Arbor during the week beginning Nov. 14th. All credentials and fees must be in the hands of the Secretary not later than November 4th. For application blanks write to E. O. Gillespie, 745 David Whitney Bldg., Detroit, Michigan.

E. O. Gillespie, *Secretary-Treasurer*

Susquehanna Dental Association

The Fifty-eighth Annual Meeting of the Susquehanna Dental Association of Pennsylvania, will be held at the Armory, Easton, Penna., Oct. 18, 19, 20, 1921. W. M. Skinner, Easton, Pa., Chairman of executive committee; George C. Knox, Middleton, New York, recording secretary.

UNITED STATES CIVIL SERVICE EXAMINATION
DENTAL INTERNE

September 21, 1921.

The United States Civil Service Commission announces an open competitive examination for dental interne on September 21, 1921. Vacancies in Saint Elizabeths Hospital, Washington, D. C., at $1.200 a year, plus bonus granted by Congress of $20 a month, with maintenance, and in positions requiring similar qualifications at this or higher or lower salaries, will be filled from this examination, unless it is found in the interest of the service to fill any vacancy by reinstatement, transfer, or promotion.

All citizens of the United States who meet the requirements, both men and women, may enter this examination; appointing officers, however, have the legal right to specify the sex desired in requesting certification of eligibles. For this position in Saint Elizabeths Hospital unmarried men are desired.

The department states that it reserves the right to terminate the appointment at the expiration of one year of service if it is deemed advisable to do so.

In addition to many interesting cases presented, the dental interne is given an excellent opportunity for study and for doing experimental and research work in the pathological, histological, and other laboratories of the institution.

Applicants are required to be graduates or senior students of regularly incorporated dental colleges, and applications will not be accepted from persons who have been graduated for more than two years. The names of senior students will not be certified for appointment until they have furnished proof of actual graduation.

Statements as to training and experience are accepted subject to verification.

Applicants must have reached their twentieth but not their seventieth birthday on the date of the examination. In view of the retirement act, at the request of the appointing officer certification will not be made of eligibles who have reached their fifty-fifth birthday.

Applications—Applicants should at once apply for Form 1312, stating the title of the examination desired, to the Civil Service Commissioner, Washington. D. C.

SUGGESTIONS

CONDUCTED BY F. R. CHAPMAN, M.S., D.D.S., COLUMBUS, OHIO

(To Our Readers: Give others the benefit of your practical suggestions by sending a description of them to Dr. F. R. Chapman, Schultz Building, Columbus, Ohio.)

Quick Repair for Porous Places in Plates

Whenever you desire a quick repair for porous place in plate, cut out that part, save the fine powder, mix powder with synthetic porcelain, then fill cavity. After this has solidified and is polished it is very difficult to detect place repaired. Use rubber filings from some plate you are to repair.—*C. I. Faison, Dental Digest.*

An Easy Method of Replacing a Broken Tube Tooth

In short-bite cases it is not extraordinary for a tube tooth to become broken and it is a tedious and laborious task to grind in a new one to take its place, many times the result being far from satisfactory. This can be overcome by first grinding a new tooth approximately into position and setting with a synthetic porcelain cement of the same shade as the tooth. When polished finally with stones and disks the result will be equal in appearance and strength to the original tooth.

—*L. L. Mann, Cosmos.*

Do Not Become Narrow Minded

The great demand for the replacement of partial sets of teeth where a few of the natural organs have been lost, leaving spaces in the arch to be filled by artificial substitutes, has awakened the ingenuity of men to a very wonderful degree. It has resulted in many methods or systems of replacement, each of which has its virtues and its indications in practice. Each commands our respect for its ingeniousness and its applicability to certain cases. The men who have worked out these various systems are entitled to our consideration and commendation—up to a certain point. That point is reached when they become narrow enough to claim universal applicability for their own method to the exclusion of all other methods. The moment a man, however brilliant he may be, sees only one thing in practice, or only one method, that moment he becomes dangerous. And the moment he systematically begins to discredit or tear down other methods to advance the claims of his own, that moment he becomes despicable. When will humanity learn that no man ever succeeded in elevating himself by the process of undermining others?

—*C. N. Johnson in Pacific Dental Gazette.*

Shortening the Charmichael Technic

After completing the preparation of the tooth for the crown (and there is a marked tendency to discontinue the cervical ledge) fit three copper bands not too snugly but rather a little loosely over the tooth. These copper bands may be purchased either ready-made in progressive sizes, or can be made at the chair. Now use these bands to take three modeling compound impressions of the prepared tooth. After moistening, pour these very carefully in inlay investment. When set, slit the bands with a disk and the modeling compound will very easily separate itself from the investment casts. It now becomes a very simple matter to flow melted inlay wax over these casts as desired, attaching a sprue wire and following the rest of the casting technic, as usual. Before painting the waxes it is a good plan to wet the investment model so that the second mix will adhere to the casts. With this method there is never any necessity to touch the inside of the casting, as no air bubbles are possible.

Three impressions are taken to provide against mishaps and also, as in general inlay work, to have a choice, although in every case so far I have secured three perfect castings.

The same principle may be applied to cast-clasp work with an equal if not greater degree of satisfaction.—*S. D. Klaus, in DentalCosmos.*

A Precaution in use of Novocain

It is very important to note that novocain is precipitated by alkalies, and if a solution of it be drawn, for example, into a syringe which has previously contained an alkaline antiseptic and has not been thoroughly washed out, the anesthetic power will be more or less completely destroyed. Disregard of this fact has undoubtedly been the cause of many failures in local anesthesia.—*R. L. O'Sullivan in Dental Record.*

Use of Dental Floss

Dental Floss tied in two knots about one half inch apart, and worked between the teeth, readily brings out all dirt, even to the largest pieces, which smooth floss will not do.—*S. Adachi, in Oral Health.*

To Inhibit Caries

Another question arises: Have we any material other than nitrate of silver which, when applied to carious surfaces, will inhibit its progress or, rather, sterilize the cavity? A fifty per cent. solution of thymol, in acetone, applied to a dentin surface which must be thoroughly dehydrated, will accomplish this purpose. We cover it with a thin, hard-drying varnish protected by a double coating.—*Herman Prinz, Dental Items of Interest.*

Removing Rouge Stains

For removing rouge stains from bridge work and vulcanite dentures after polishing, saturate a pledget of cotton with ammonium fluorid (Metalline), place same on the stain allowing it to remain for a moment, when the stain can readily be rubbed off.—*W. A. Pierce in Dental Cosmos.*

Surgeons Soap

I beg to present a formula for making a soap that I have been using in my practice for a good many years, one that thoroughly cleanses and does not injure the skin. It may also be used for washing patients' faces before operating.

Green soap, 35 oz.
Alcohol, 95 per cent., 9 oz.
Glycerin, 13 oz.
Salicylic acid, 94 gr.
Water, 90 oz.

If unable to obtain pure alcohol, that which contains a small amount of lysol can be used, but do not use alcohol containing formaldehyd or bichlorid of mercury.

Mix the soap with glycerin and salicylic acid and stir in a small amount of alcohol, constantly stirring until well mixed, then slowly pour in the boiling water, constantly stirring. After all the water is added, then add and stir in the remaining part of the alcohol. Let stand until cold, and filter through filter paper.—*J. M. Rosenthal, Dental Cosmos.*

To Diminish Tartar Deposition on the Teeth

The prolonged internal administration of reasonable quantities of mild alkalies, especially in those subjects which show indications of acidosis, is always followed by diminished tendencies of tartar deposition. These alkalies may be taken as simple sodium bicarbonate, *i. e.*, about 5 grains dissolved in a large tumbler of hydrant water, about twice a day between meals, or in the form of artificial or natural Vichy water. Without entering into a discussion of the therapeutic action of alkaline waters of the Vichy type, in itself a most complicated subject, the fact remains that these mineral salts regulate the carbon-dioxid tension of the blood. As a consequence, the output of calcium salts by the urine and, incidentally, by the saliva is restricted to normal bounds and the tendency of tartar deposition is diminished. These clinically observed facts may be readily verified by the dental practitioner in his own clientele. On the other hand, it may be stated that in those patients who show a preference to acid foods and drinks an increase in tartar deposition is usually noticeably manifested. In those countries in which the consumption of large quantities of acid wines is a national habit, heavy tartar deposits are very common.—*Hermann Prinz, in Dental Cosmos.*

To Sterilize Instruments

Use an oblong agate affair bought at hardware store, just right size to hold forceps, etc., fill with water, using about a teaspoonful or more of common washing soda costing about one or two cents per pound; remove forceps after boiling and when right to handle polish with towel. They will look like new and there will be no "rusting."—*C. P. S., Dental Facts.*

POPULAR DENTAL EDUCATION

DENTAL WELFARE FOUNDATION

645 Liberty Avenue, Pittsburgh, U. S. A.

At the June meeting of the American Dental Trade Association held at Hot Springs, a paper was read on the subject of Popularizing Dentistry. Reprint of the paper will be forwarded to all who write for it. In brief, the plan is to mail cards bearing educational matter to lists of names supplied by dentists and others interested, endorsed by the National Dental Association.

At the Milwaukee meeting of the National Dental Association, a paper was read embodying the same general idea, and we are happy to say that following its presentation, the plan was approved by that organization, and permission has been granted to make public announcement of that fact.

The campaign will be conducted under the name of the Dental Welfare Foundation, with headquarters at Pittsburgh.

Dr. Otto U. King, secretary of the National Dental Association, has been appointed as a trustee to represent the Association in the councils of the Foundation.

The co-operation of the dental profession and trade in the dental education of the public cannot result otherwise than to the incalculable benefit of humanity.

Dealers and salesman will be supplied with samples of the cards it is proposed to distribute in advance of an intensive eight weeks' drive which starts October 1st.

Manufacturers using full page space in dental magazines are donating space for the use of the Foundation in the October and November issues of all dental publications.

The total cost of mailing the cards twelve times during 1922 to a list of 1,000 names is $180.00, which is a very moderate contribution to the cause considering what others are doing. Dentists will be asked to bear a part of this expense.

This is to be considered as a preliminary announcement. Readers will find full details in our October issue.

OBITUARY

DR. EVERETT M. COOK, TOLEDO, OHIO

AT HIS HOME, 1080 Prospect Avenue, Toledo, Ohio, Monday, August 8, there passed from earth and earthly association Dr. Everett M. Cook, aged sixty-three years, four months, twelve days.

Dr. Cook was born at Warwick, Mass., March 26, 1858. After graduating from the Barrie High School of that city, he entered the dental office of an uncle, where he served a practical apprenticeship, which he afterwards supplemented by a course in dentistry at the University of Pennsylvania, graduating in 1882.

In 1884 he moved to Litchfield, Connecticut, where he was united in marriage with Miss Nettie Jaquet, who survives him.

He came to Toledo in 1888 and established himself in practice in which he remained until a short time previous to his death.

Four children were born of his marriage, two of whom, a daughter Mrs. G. B. Jewell, and a son, Everett J. Cook, survive him.

Dr. Cook was a member and past-president of the Toledo Dental Society; the Ohio State Dental Society; the National Dental Association; the Connecticut Valley Dental Society, and Honorary Member of the Odontological Society of New York.

Dr. Cook was a quiet, unassuming gentleman in every sense of the word; one who made and kept many friends. In the practice of his profession he was progressive, earnest and able, particularly loving the unusual and the difficult. Some of his productions were remarkable for their ingenuity, originality and practicability. He will be missed by his associates in the profession that he loved, in his social environment and his family, in all of which his life was so lived that it may well be taken as an example by those who survive him.

Funeral services held at the residence, on Wednesday, August 10, were attended by the Toledo Dental Society in a body, from the membership of which the pallbearers were chosen, and by many friends. Interment at Woodlawn Cemetery.

EARLY EXPERIENCES OF A PIONEER DENTIST

Dr. Adam Gants, of Ligonier, Indiana, where in his eighty-third year he is still practicing after sixty-two years of continuous practice in dentistry, tells some interesting early experiences in his practice which we are here noting for the benefit of readers of THE SUMMARY.

He located in Ligonier in December 1859.

Indiana at this time was sparcely settled and many of the homes were log cabins. The villages were small and Ligonier was a town of this type. He opened an office over the general store of Sol. Mier, paying $4.00 a month as rent,—at that time considered a high price. He obtained good board and room for $1.50 per week,—not paying in advance, however, as his capital in coming to Ligonier was only $2.50, out of which he must furnish his office.

His office equipment consisted of three stools, purchased of R. D. Kerr at 25 cents each (one of these is still in use in his office in Ligonier); a poplar board for a work bench; a wooden box for a cabinet; and an old discarded kitchen chair with a head rest which he made himself, for an operating chair. These purchases left a balance on hand of $1.25. The building was new and included in the rent was a box stove, without legs. This he set up on bricks and used the rest of the winter.

Dr. Gants tells some very interesting anecdotes of his long experience as a dentist and especially of his early practice. His description of the methods used, is very amusing as well as exciting. He is presumably the oldest practicing dentist in the United States in length of continuous active service. He has seen the profession develop from primitive and painful methods to its present marvels of skill and he has had an active share in the making of many of the steps required to bring it to its present status. When he first opened his office in Ligonier, dentistry was practically an unknown science, except in the larger cities. The family physician pulled the teeth that ached until so many were gone that artificial teeth were necessary. These were crude affairs at best.

There were only two dental colleges in the country at that time, one in Cincinnati and one in Baltimore or Philadelphia, and the idea of eliminating the pain element from operations was considerably neglected. The text books used were: Harris on Principles and Practices of Dental Surgery; Fox on Mechanical Dentistry; and Bond on Dental Medicine.

There was a great deal to contend with in attempting to introduce dental surgery in small communities in those days. For one thing, people did not understand it; the equipment and methods were crude; the physicians disliked competition; the dentists were very few and far between. It was a long time before people could be convinced that artificial teeth could be made and used, therefore, the fees obtained did not accumulate very fast at first. His charge for extractions at that time was 25 cents.

The physicians used the turn-key to extract with and charged a shilling (12½ cents). Forceps had come into general use by dentists. The first pair which the Doctor used were made by his father and had done good service on the farm.

In the earlier days dentists did not use anesthetics. As a rule, chloroform was the agent used and was administered by a physician. It was always desirable to do the extracting as quickly as possible and therefore the dentists of those days had to work rapidly. The best record the Doctor ever made was eighteen teeth in a minute and a half; and the greatest number of extractions in a single day was one hundred and one teeth.

Extractions were sometimes accomplished without recourse to forceps. Dr. Gants states that in an emergency he had used many strange devices for the purpose. In one instance he used a hairpin. On another occasion he used a pair of scissors to extract with, and his account of the incident follows:

"My home was about half a mile from the compact part of the village. It was about two o'clock one very cold morning, and John Clawson, who lived in a log cabin about a mile and a half north of town, came with an aching molar and insisted upon extraction. There had been a severe snow storm, and I did not care to go to my office at that time of night to earn a 25-cent fee. I had no instruments with me, so made use of one blade of a pair of scissors as an elevator and relieved him of his aching molar and saved a trip through the storm.

Many people did no realize the value of taking care of their teeth and as a result, felt no need of patronizing the dentist. The lack of knowledge at that time of devitalizing and filling the roots (which fact accounts for the large number of extractions) together with indifference of the medical profession toward the new science, made the situation a difficult one.

In filling teeth, gold, tinfoil, and amalgam were used. Mouth napkins were used to keep the mouth dry, as rubber-dam was unknown in the earlier days. The Doctor made his own amalgam by filing a silver dollar and adding the filings of block tin and of copper, removing any iron with a small horse-shoe magnet. These filings were apparently as satisfactory as those of the amalgam of today, except that they became very black.

He put in many long hours in establishing his practice and was at work many times before daylight, remaining until late into the night, often without stopping for his meals.

In those days it was customary to drive out many miles to obtain the necessary impressions, and for this service no extra charge was made.

Artificial dentures were made from gold, silver and platinum. The dies for swaging were made at the forge of some friendly blacksmith and the plates were struck upon on his anvil, using his heavy hammers. The teeth were backed with gold, silver and hard soldered to the plate, an alcohol lamp and mouth blow-pipe being used for this purpose.

Following the metal plates came porcelain. Later on plates (the term "denture" was not then used) were made of celluloid and rubber, and gold plates fell into disuse on account of the cost.

Dr. Gants was the first dentist, so far as he can learn, to use tinfoil (No. 10) over plaster to polish the palatal and lingual surfaces of the vulcanite dentures.

He was also among the first to conceive the idea of crowning teeth with gold. His first crown work was done for Peter Sisterhen, and was a left lower cuspid which had been worn short by holding his clay pipe. This cuspid had been worn short almost to the nerve. To avoid cutting into the nerve, the gold crown was made, although that was not what Dr. Gants called it then. The measure was taken with a silk thread and a gold band with a flat top soldered on was driven down on the tooth nearly to the gum. This lasted for more than twenty years,—in fact until the man died,—giving perfect satisfaction in the way of service.

Many of the earlier porcelain crowns were made to use with wooden pins. A cut was made in the side of the tooth; with a sharp blow the top of it was driven off; after this a red hot wire was thrust deep into the root canal. The canal was then cleaned and a pivot tooth put in.

Dr. Gants' first experiment with replantation was for a Dr. Jennings, of Millersburg, a town about twelve miles away. The physician was passing through Ligonier on a call and was in a great hurry. Having the toothache, he called on Dr. Gants to have the tooth extracted. The Doctor having read of replantation, suggested that he extract the tooth, fill the cavity and the root and replace the tooth. This he did while the Doctor waited. It was done by extracting the tooth and keeping it in warm water while he cleaned out the root canal. He then filled the root and also the cavity and the tooth was replaced in the former socket and proved quite satisfactory for several years. This same method was used on a lower molar and on another patient at a subsequent time.

His son Frank, located and practiced dentistry in Harbor Springs, Mich., near Petoskey. In this neighborhood were some Indians with whom he became quite friendly, and upon his visiting their camp at one time they made him a chief of their tribe with great ceremony, calling him "Chief Zagomo," by which title he was always recognized whenever any of the tribe met him.

Dentristry, through Dr. Gants, at one time proved quite an aid to "Dan Cupid," as the following amusing incident will show. It was in the case of a widow who called upon him one day stating that she did housework for a living; that she had a little girl; that she received only $1.50 a week and board for the two of them. She said there was a gentleman of some means who was calling on her and as her teeth were gone, she thought a set of false ones would greatly enhance her charms and incidentally her opportunity for matrimony. She said she would be able, if she did marry this man later on, to pay for her teeth, but otherwise it would be absolutely impossible. She asked the Doctor if he would be willing to make her a set of teeth on these terms. This he did, and in due time received his pay from her husband.

Gold — the Eternal Metal

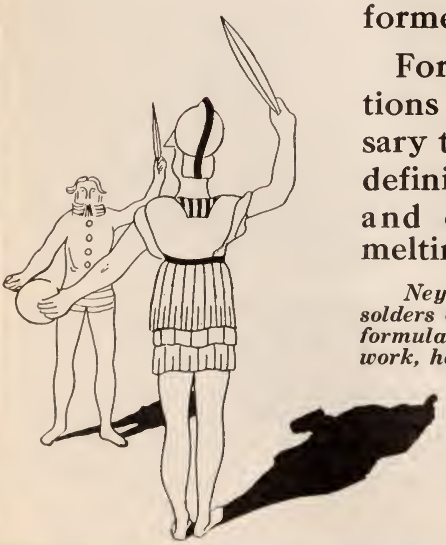
Etruscan Soldering

THE peculiar style of the jewelry produced in ancient Etruria was due to the granular or soldering method of applying the ornamentation. After the article was shaped, tiny globules of gold were soldered to it to form the design.

Modern dentistry employs soldering, not for ornamentation, but for construction; many caps, bands, bridges, etc., being formed in this way.

For these delicate operations it is manifestly necessary to have gold solders of definite working properties and of several different melting points.

Ney's Standard Solders and the solders of the Ney-Oro Series (Weinstein formulae) are peculiarly adapted to this work, having been prepared with special reference to their several definite purposes.



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NEWS and OPINIONS

CONDUCTED BY G. E. HARTER

In our August number, as well as in this issue, there appear articles from the pen of William A. Lurie, M. D., New Orleans, La., on the use and abuse of "penetograms," commonly called X-ray films, as an indication and index of irritation or infection of dental origin, that should be of great interest to dentists. Dr. Lurie has made a thorough study of the entire subject, and has a message that dentistry should very carefully consider. I had the pleasure of hearing Dr. Lurie twice during my visit at Bluefield, W. Va., last April, and found him an intelligent gentleman, well acquainted with his subject, and able to give instruction in an acceptable, agreeable and effective way. Dr. Lurie is to form classes for instruction in Northern Ohio and near-by sections in October, and his announcement appears in this number.

A new ninety-six page catalog of medical, nursing, pharmaceutical, and dental publications, issued by the C. V. Mosby Co., St. Louis, Mo., has just been received and filed for reference. The catalog is illustrated, and is of great interest in itself to say nothing of the valuable list of professional books embodied therein. Every dentist is invited to send for a copy.

Jazz music (?) and joy riding! These two forms of dissipation and degeneration are destroying the youth of America. At least that is the opinion of prominent educators who say that the grade-graduates of ten years ago were better educated than the high-school graduates of today, and that the high-school graduates of that period had more education than the average college-graduate of today; adding that unless something is done to restore the lacking child-discipline America will soon become a nation of illiterates, entirely controlled by their elemental whims and inclinations, regardless of duty or the rights and liberties of society. Edward T. Downer, registrar Western Reserve University, at Cleveland, backs up these statements by saying publicly through the press that of 1,500 graduates of Cleveland high schools who applied for admittance to the college, 60%, or 900, were unable to make the Freshman class—only 40%, 600, being accepted. Prof. Downer suggests as a remedy the resumption of a little parental authority and discipline, throwing jazz-records into the garbage where they belong, and keeping the auto in the garage at least five nights of every week during the school year.

Too much laxity, too much back-talk to parents, too little regard for others, too much and too early emphasis on sex, too much disposition to do nothing without being driven, too little respect for parents, too little attention to the refinements of life, too much disposition to get without giving—the category might be extended almost indefinitely, but it would all end in too little preparation for the serious duties of life, too little realization of the fact that life is not a dream of sensuous enjoyment but a matter of stern duty that must be met and fulfilled or end in shipwreck, moral and physical.

Seems to me that teachers themselves do not realize these things, and I know that most parents fail utterly to do so. "O, well; he's only a boy!" is the excuse on the tongues of too many parents these days, and covers delinquencies that their own parents would have met with condign punishment. Laxity everywhere; high ideals nowhere; elemental impulses magnified rather than restrained—these things tell the story of this modern America of ours, and that in the face of such a crisis as the world never before has had to meet. And, of course, "nobody is to blame!"

A lesson may be drawn from the suicide of Thomas D. Waterbury, owner and manager of one of the largest "Dental Parlors" in New York, who literally worked himself to death in the effort to accumulate a large fortune through the services of others. He succeeded, of course, as all men do who devote their entire energy to such a purpose; and has paid for his success with his life. Seems to me it is better to be contented with less money and get more out of life, and particularly to put more INTO life, of the things that really are worth while.

Work on the new Marquette University $300,000 dental building began July 12. It is intended to be the most complete dental college in America.

Keep you mind clear of the metric fallacy. For some reason unknown, a group of men are trying to supplant our time-tried English system of weights and measures with the bothersome and unsatisfactory metric system as used to some extent in South America and rather generally in France and some other European countries. The idea of these men is to force the foreign system upon us willy-nilly. I haven't time, space or patience to enter into the subject here, but we want nothing to do with it. Let scientific men use it to their heart's content; let anybody use it that likes; but oppose its forced adoption under any pretext whatever.

If a patient complains of "that tired feeling," particularly an abnormal desire for sleep, if he "wakes up as tired as when he went to bed," suspect tooth or mouth infection, and proceed to verify that suspicion. It is one of the clearest indications of bad mouth conditions.

Ninety per cent. of the children attending public schools have bad teeth and require dental attention. No use to spend time and money making examinations, except to prove this fact to school authorities. All reports of examinations already made prove it. Those interested in school clinics may safely take this average for granted and work from it.

Chemical Trades Endangered by Threatening Anti-Saloon League Legislation

BY CHARLES BASKERVILLE

Professor of Chemistry of the College of the City of New York and Member of the American Chemical Society Committee on Industrial Alcohol.

When the chemical and allied industries wake up and find that they face extinction as a result of the new Volstead Bill, if enacted, there will be many complaints. As one concern after another goes to the wall, there will be loud lamentations and appeals to members of Congress, the Federal Departments and the Courts.

But then it will be too late!

Now is the time to act; to work, to send letters and telegrams to Congress and to hold meetings of protest.

Who can blame the Anti-Saloon Leaguers for passing a bill they want, if they can? That is their business, regardless of what they do to industry or to science or to medicine.

The fact that there is a division in the so-called "dry" forces should not create over-confidence or lull anybody to sleep. The genuine Prohibitionists, represented by thoughtful conservatives who are mindful of the legitimate needs of industry and medicine, are opposed to the new Volstead Bill. But the extremists are beyond reason, and they are only fighting the harder without a thought of the damage they will do to everybody and everything else.

If the chemists and the manufacturers rely upon the division among the Prohibitionists for salvation they are only inviting disaster.

Members of Congress will not be to blame if the chemical industries are destroyed. These men are elected from districts in all parts of the country. They are not chosen because they are chemical experts or food experts or medical authorities. They might know but rarely do know much about any of these subjects.

But the members of Congress take pride in representing the needs of their districts. They are always ready to listen to the "voice from home."

The members of Congress should hear from home!

There is probably not a Congressional District in the United States that does not contain an industry dependent upon the use of alcohol, whether it be a drug manufactory, a paint or varnish works, a photographic establishment, a dye works or even a retail druggist.

The representatives of that District may not have any knowledge whatever of that fact. It is for the chemist, the manufacturer, the physician, the druggist, the leaders in trade and business to tell him.

If the Congressman is not told, who is to blame?

The members of Congress should be told that the new Volstead Bill known as H. R. 6752 is a bill aimed at the industry and the business of the United States. They should be told that it is much more than a bill to prevent the use of beer—that it goes much further and places impossible and absurd handicaps on the conduct of any legitimate industry using alcohol.

The opposition to the saloon, the opposition to the use of spirituous liquors is not involved in this discussion. It is not a question of law enforcement, as the chemists and manufacturers are united for enforcement of the existing law. The members of Congress have a right to know that.

It is for the trade to advise their representative in Congress of the facts and of their vital interest in this legislation.

Every chemist and every manufacturer and everyone else connected with the use of the chemical alcohol in science or the arts should make it plain to his Representative in Congress, the man from his own district.

Remember, Congress may act quickly.

The message should be sent immediately.

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Made in five grades
ASK FOR THE YELLOW PENCIL WITH THE RED BAND
EAGLE MIKADO
EAGLE PENCIL COMPANY, NEW YORK

Two brothers employed in the Illinois state department of registration and election, Cassius Erler and E. F. Erler, are reported in the public press to have confessed that they sold examination questions to students of dentistry, medicine and pharmacy, resulting in the cancellation of all June examinations in those departments. The pity of it is that they should have been able to find buyers. The public is to be congratulated that the leak was discovered in time. What sort of professional men could be expected from such material? I know a man who once agreed to pay the total expenses of a young man through preparatory, literary and medical courses—some six or seven thousand dollars. Before the first course began, the young man was heard to gloat over the enormous fees he expected to collect in practice. The would-be philanthropist instantly and very rightly withdrew his promise, because the young man seemed to see nothing in a profession except opportunity to extort a large income, whether earned by service or otherwise. Such a man is dangerous in any profession.

Always remember that a profession carries obligations as well as rewards. A business man may be justified in getting all he can for as little as possible; but the professional man is in honor bound to give as much as he can in real service for all that he gets.

Diplomas do not make professional men. Nothing but the desire to serve can do that.

If you are a member of the "Anvil Chorus" in your town, resign. Make up your mind that your neighbor is doing the best he can according to his development; that telephone, telegraph and other corporations are doing more for you than you would do for them were your circumstances reversed; that the big business of this country of which you are or ought to be proud, could not be done without large associations of capital; and that you would be incalculably worse off were we to return to the ancient simplicity of barter, or to the small individual concern, each trying to cut the business throat of every other. Try to get into your consciousness the fact that men make conditions and conditions do not make men. Labor does not ennoble any man; man ennobles labor—or makes it degrading, just as he will. This country is just precisely what the people living in it have made it. If you want a better country or a better world, help to make it so by being a better man, a better citizen.

The Illinois board-question scandal grows worse and worse. Director Miller, of the State Board of Education, says that copies of the dental questions were sold as high as $935 a set; the pharmacy questions brought $500, and the medical somewhere between the two. I think I can understand the mind and morals of the men who were willing to sell the questions, but those of the buyers have got me stumped. It seems to me impossible that any man could be willing to begin professional life on the basis of such flagrant dishonesty. What can he hope to gain? Better chop wood, pick up chips, peddle pencils or anything else than to attempt to practice dentistry, particularly, without sufficient preparation to pass the average examination.

They are fining "dentists" $50 and costs in New York City now for practicing without a license! Why not reduce it to $5, payable in advance? Sort of an "indulgence," as it were. Illegal practice never can be stamped out by such mollycoddle methods. Any number of men could probably be found who would willingly submit to such a fine once a week for the privilege of practicing.

Practically 100% of children who are anemic or tubercular have bad teeth. Always suspect T. B. in the presence of unusually bad teeth in children. There need be no guess about anemia. A bloodless condition certainly speaks for itself. When T. B. is suspected, try a Wassermann.

Dr. L. L. Sheffield, Toledo, is to give a two-weeks' course in denture prosthesis at Atlanta, Ga., in September.

HANAU ARTICULATOR

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Fully adjustable to comply with the most exacting anatomical requirements.

Indispensable for correctly setting up and grinding-in artificial dentures.

PRICE $50.00

Hanau Articulator equipment for laboratories $115

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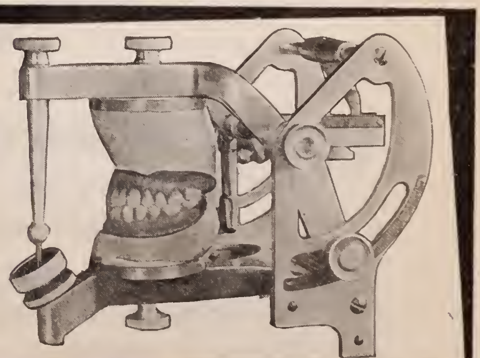

The supreme Test

You can imagine what denture failure would mean to this woman!

WHEN a hostess faces her friends and family for the first time after receiving artificial dentures, her dentist's reputation is in the balance. Her ***appearance,*** her ease in managing the dentures in speech and mastication will spell success or failure; a grateful patient or a relentless critic.

It is not alone the woman of means and social prominence who demands dentures that restore natural appearance—***every*** woman wants to appear at her best. It is just as important to you to have "Mother's teeth look natural" on "Main Street" as on "Fifth Avenue".

Trubyte

—the Teeth that Build Reputation

A denture that harmonizes so naturally that it deceives the eye will do more to build a reputation for skill than any other achievement in dentistry—and the use of Trubyte teeth will do more to make such an achievement possible than any other means available to the profession.

Occasionally we find dentists who do not believe their patients can appreciate or afford Trubyte service—dentists who say they ***wished*** they could use Trubyte teeth exclusively. We always advise such men to ***show*** Trubyte teeth in comparison with others, preferably with one of the patient's family present. That usually settles the question.

Treat your patients just as though they were the kind of patients you ***wish*** you had, and most of them will prove to be that kind.

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Ohio—Rehwinkle

Washington C. H., Aug. 8—The following officers have been named on various committees of the Rehwinkle Dental Society by Dr. C. H. Martin, president.

The executive committee, including officers of the society, being O. O. Thompson, chairman, Hillsboro; A. M. Bush, Washington C. H.; M. G. Phillips, Chillicothe; R. E. Peele, Wilmington; H. R. Clark, Circleville; W. G. Hamm, Chillicothe; O. W. Mills, Chillicothe; John Galbraith, Chillicothe.

C. W. Soddars of this city, is chairman of the Program Committee as well as vice-president of the society; S. T. Yaple, Chillicothe, chairman of publicity; L. G. Martin, New Vienna, on bylaws; Fred D. Woollard, Washington C. H., chairman membership; C. V. Lanum, Washington C. H., chairman Library; W. G. Hamm, Chillicothe, chairman Oral Hygiene; F. R. Smith, Wilmington is censor.

Michigan—Fifth District

Muskegon, July 19—More than 20 dentists from western Michigan attended the annual summer meeting of the Fifth District Dental Society of Michigan, comprising the counties of Muskegon, Kent, Ottawa, Newaygo, Mecosta and Oceana, at the Muskegon Country Club yesterday.

The day was spent in playing golf and tennis, the winners of the two events receiving two splendid trophies which will become their permanent property after winning in the same event three consecutive years. In the evening, two four-round boxing bouts between local bantamweights provided amusement for the dentists.

Dr. C. P. Hildreth, of Grand Rapids, formerly a Muskegon man, won the blind bogey handicap golf tournament. He won a medal 92 with a four-hole handicap, leaving the score at 88. Mr. Hildreth received some close competition from Dr. Frank Cunningham, of Ludington, who is considered one of the best golfers of the Country Club of that city. Another who deserves honorable mention in the golf tournament is Dr. William Stander, city champion from Grand Rapids, who played a good game.

The tennis tournament was won by Dr. William Thwaiths, of Grand Rapids, who captured the honors by high-class playing but failed to get anywhere near equal opposition. The process of elimination or the "survival of the fittest," was used in the tennis tournament.

Wisconsin—State

Milwaukee, July 13—Dr. E. C. Oviatt, Columbus, Wis., was elected president of the Wisconsin State Dental Society at its meeting Tuesday afternoon. J. M. Donovan, Neenah, was chosen first vice-president, and E. N. Kapitan, Manitowoc, second vice-president. R. W. Huegel, Madison, was elected secretary, while Adolph Gropper, Milwaukee, was elected treasurer, and Roy Hopkinson, Milwaukee, librarian.

The Executive Council includes: Drs. Oviatt, Huegel and Grupper, C. W. Hall, E. A. Geilfuss, both of Milwaukee; D. L. Floore, Columbus; N. P. Scherer, Kenosha; T. A. Hardgrove, Fond du Lac; J. V. Miller, Manitowoc; W. T. MacFarlane, Tomahawk; J. V. McKee, Madison; Oscar Meng, Madison; F. C. Wetzel, Milwaukee, and H. G. Morton, Milwaukee.

Couldn't Fool Him

A man came into a dentist's office to have a tooth filled, claiming he had never visited a tooth doctor before. The dentist began to bore. He bored and bored and bored until finally he looked in surprise at his drill. "Didn't you tell me," he asked the victim wearily, "that you had never had your teeth worked on before?" "Yessir," quoth the man in the chair. "Well, I find gold on the point of my drill. How do you explain that?" "Now, Doc," the victim answered wearily, "They ain't no mystery about that. You go it off my collar button."

Marion, Ind. dentists are taking action looking to the foundation of a free school clinic.

Dental X-Ray Instruction

DR. WILLIAM A. LURIE
of New Orleans, La.,
Will conduct a three-day post-graduate course in
Dental Roentgenographic Interpretation
during October. The course covers every phase of the subject.

COMING CLASSES

Cincinnati - - - -	October 3, 4, 5
Cleveland - - - -	" 6, 7, 8
Pittsburgh - - - -	" 10, 11, 12
Buffalo - - - -	" 13, 14, 15

For particulars of other classes address
DR. WILLIAM A. LURIE
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DEATHS

At St. Louis, Mo., July 20, of "sleeping sickness," Dr. Theodore R. Dodsley, aged 44. He had been affected for several months, without any of the ordinary symptoms of disease, sleeping almost constantly, waking only to eat.

At Evanston, Ill., July 24, Dr. Luther D. Henderson, aged 75.

At Greentown, Ind., July 20, Dr. W. E. Armstrong, aged 54. Without cause known or guessed at, Dr. Armstrong ended his own life by the carbolic-acid route. He was well known as a lecturer on various topics, as well as dentist and physician.

At. Poynette, Wis., July 27, Dr. Riley Hutchinson, aged 46.

At Wellsburg, W. Va., July 17, Dr. Karl G. Brashear, aged 42.

At Woodstock, Vt., July 26, Dr. J. B. Wells, of Morris, N. Y., aged 76.

At Detroit, Mich., August 1, Dr. William F. Quinn, aged 36.

In the death of Dr. Quinn the dental fraternity has lost one of its foremost authorities on diagnosis and photography. Since his return from the service in the navy, Dr. Quinn engaged in Detroit solely in these branches of his profession, and has made extensive research to improve his technic. In 1918 he entered the navy as a dental surgeon and was stationed at Great Lakes training station, where he examined thousands, rendering expert opinion. He returned to Detroit September 1, 1919 and opened his office.

Dr. Quinn was born in Syracuse, N. Y., in 1885 and was graduated from the engineering dental department of the University of Michigan in 1913; two years later he started his practice in Big Rapids. For two years he worked in Big Rapids and was connected with the board of health of that city. He moved to Detroit in 1915 and started private practice, beginning to specialize in the same year.

He was a member of the First District Dental Society, Michigan State Dental Society and the National Dental Society. He was a member of the Alpha Zeta chapter of Kappa Sigma, a member of the Knights of Columbus, the Elks and the Detroit Yacht Club. A member of the U. S. Naval Reserve Force, he was particularly active in the organization of the Dental Veterans of the World War.

At Landsdowne (Philadelphia), Pa., August 12, Dr. Matthew H. Cryer, professor emeritus of oral surgery at the University of Pennsylvania, and a veteran-major of the Civil War, aged 81, from the effects of an unsuccessful operation performed a month prior to his death. Dr. Cryer was known as a writer on dental subjects as well as a successful teacher, many of his articles having been printed in THE SUMMARY and other dental magazines.

At Monroe, Wis., August 10, Dr. W. H. Caradine, aged 61.

At Elma, Iowa, July 25, Dr. William Wallace Cannon, aged 25. He was a graduate of the Iowa University Dental School in the class of '21.

We deeply regret to announce the death on July 15, of Mr. Frederick Nelson Johnson, Vice-President of Johnson & Lund, Inc., Philadelphia, Pa.

Cincinnati Health Exposition

Bringing back memories of the great World's Fairs of the past, and linking their accomplishments with the wonderful progress made in the industrial and scientific world since those wonderful exhibitions, is the great Cincinnati Health Exposition, to be held in Music Hall, Cincinnati, Ohio, October 15 to 22.

The exposition has received the endorsement of President Harding, Governor Harry L. Davis, of Ohio and the Mayors and Health Commissioners of thousands of cities throughout the whole country.

The most prominent health experts in America have accepted invitations to lecture on various health matters during the exposition. The program will be varied by showing motion pictures depicting the simplest methods of safeguarding the public health and interesting pageants prepared by members of local health organizations.

The entire exposition will be one of motion and every afternoon and evening during the week of October 15–22 the great auditorium of Music Hall, capable of seating more than 3,600 persons will be the scene of a variety of demonstrations and lectures by national, state and local leaders in health activities.

The exposition seeks to teach the road to health.

Here's a record: Every graduate of University of Pittsburg Dental School in the class of '21 successfully passed the State Board Examination, keeping up and excelling the record of that school. During the past ten years only 3.8% of its graduates have failed to pass the examinations in Pennsylvania and other states.

Well, THE SUMMARY has returned very nearly to schedule, this number being mailed at or near the proper time. Now that our printers have freed themselves from union domination and dictation, we may hope to keep up the good work. The strike declared May 1 had positively nothing to justify it, and has failed as it deserved to fail.

I have by no means abandoned the idea of forming a dental lyceum bureau for the assistance of program committees. The work will be slow and there is a great deal of it. If YOU are able and willing to take a place on society programs, you can help me by sending your name, address and subject. When I hear from you I will tell you the rest of the plan

Gold is Gold

There's a Williams Gold for every dental purpose

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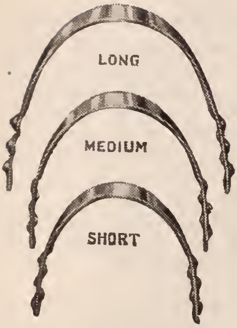

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WILLIAMS Golds for Quality! Whether you seek easy flowing qualities and strength in solders—color and ideal working qualities in gold plates -- strength, springiness and toughness in casting golds —weight, strength and proper shape in lingual bars, or shells that will not split, you will find your ideal expressed in Williams Golds.

Get quality—order Williams Golds. Depots that sell it are glad to have you ask for it by name—glad to know that *you too* have found the difference.

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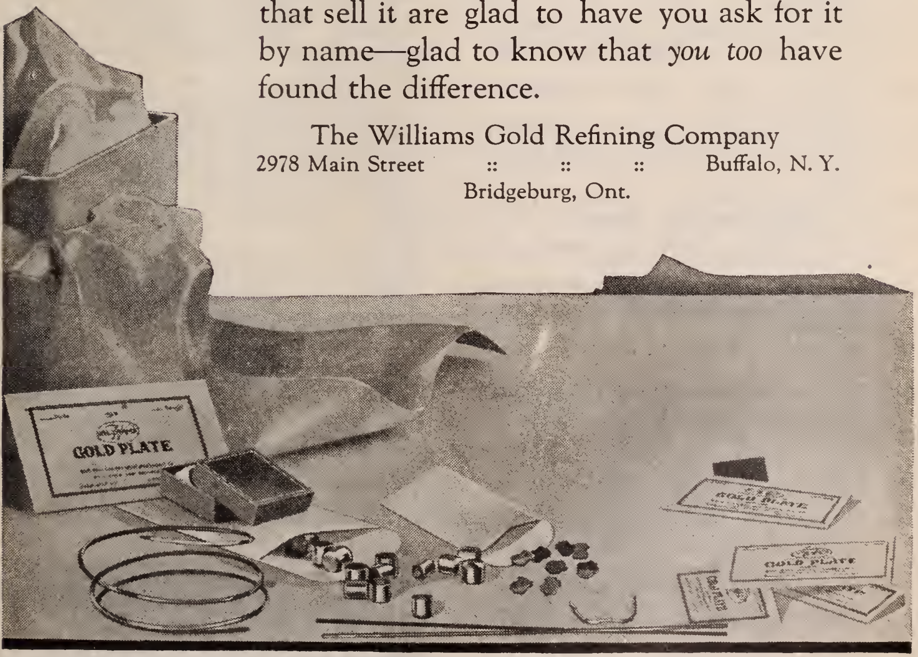

DENTAL GOLDS

Latest Patents of Interest to Dentists

1373847—Stereoscope for X-ray plates, Harry F. Waite, New York, N. Y.
1374183—Dental impression tray, Josiah S. Bridges, Chicago, Ill.
1374235—X-ray photographing appliance, Gordon E. Richards, Toronto, Can.
1374792—Dental. appliance, Edgar E. D. Woisard, Pittston, Pa.
1375479—Package for dental solder and the like, George L. Van Allen, Prince Bay, N. Y.
1376356—Unitary dental appliance, O. H. and A. F. Pieper, Rochester. N. Y.
1376163—Dental impression tray, Leslie V. Robinson, New York, N. Y.
1376514—Conversion of carbon monoxid into carbon dioxid, John C. Clancy, Niagara Falls, N. Y.
1377075—Dental articulator, Joseph Homer Boston Mass.
1376644—Artificial tooth, Frank H. Russell, Elko, Nev.
1376645—Artificial tooth, Frank H. Russell, Elko, Nev.
1376991—Blowpipe, George H. Zouck, Orange, N. J., and G. L. Walker, New York, N. Y.
57780—Design, Spatula, John H. Lickert, Evanston, Ill.
1377474—Making backing-plate for artificial teeth, Ami H. Gunther, Chillicothe, Ohio.
1377680—Amalgam mixer for dentists, Loyd R. Haight, Spokane, Wash.
1377358—All-porcelain tooth, Howard S. Lowry, Kansas City, Mo.
1377725—Sterilizing surgical instruments and other articles, James B. Pentz, New York, N. Y.
1377726—Sterilizer, James B. Pentz, New York, N. Y.
1377432—Dental engine bracket, O. H. and A. F. Pieper, Rochester, N. Y.
1377433—Dental cuspidor, O. H. and A. F. Pieper, Rochester, N. Y.
1378527—Gage for selecting artificial teeth, Wm. C. Dalbey, Du Quoin, Ill.
1378709—Holder for dental X-ray films, James M. Martin, Dallas, Texas.
1378064—Forming molds for dentists' use, Giuseppe E. Terranova, New Haven, Conn.
1378433—Dental instrument, Frank Vogelzang, Rock Valley, Iowa.
1378297—Dental impression tray, Frank W. Wallace, Chattanooga, Tenn.
1378745—Gage for selecting artificial teeth, John A. Wavrin, St. Louis, Mo.
1378306—Dental appliance, Jacob L. Young, New Rochelle, N. Y.
1379445—Dental tool, Feliciano Gonzalez, New York, N. Y.
1379360—Blowpipe apparatus, Raymond B. Pickering, Alameda, Calif.
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THE DENTAL SUMMARY
THE MAGAZINE THAT HELPS

Vol. XLI October, 1921 No. 10

A FACING THAT WILL NOT WORK LOOSE AFTER BEING CEMENTED TO PLACE

BY EDWARD EVERETT HAVERSTICK, D.D.S., ST. LOUIS, MO.

(Written for THE DENTAL SUMMARY)

WE HAVE ALL SUFFERED the embarrassment of having the shade of porcelain facings change color during the process of soldering a bridge. Consequently we have, during recent years, removed the facings before soldering the bridge and when it was completed cemented the facings into their places.

We have also suffered the embarrassment of having a porcelain facing, which we had cemented to position, come loose and fall out of place. When a patient returns to us with any of our restorations in her handbag we are compelled to assume the attitude of apologizing, and must accept the responsibility for the work although it may have been performed as perfectly as possible. So it is the purpose of this paper to explain a facing that will not come loose after it has been cemented to place.

The loosening of a facing is even more common now than formerly on account of the very short pins which the manufacturers are using since the advance in the price of platinum. However, the long-pin facing would loosen at times, due to the extreme difficulty in putting the cement to the bottom of the small pin-holes without trapping air in them as we work the cement down into place.

The difficulty may be overcome by constructing a different kind of retention, or, in other words, by making a loop or staple-shaped retention out of the pins.

THE METHOD OF PROCEDURE

From a strip of gold two millimeters wide, (*Fig. I*), cut a piece a little longer than the distance between the pins of a porcelain facing so that a hole may be punched in either end, into which the pins of the facing will fit.

Place the tip of the pins (*Fig. II*), into the holes and wax the strip of gold in that position. Invest the facing and solder the strip of gold to the end of the pins, flowing some solder across the strip of gold from one

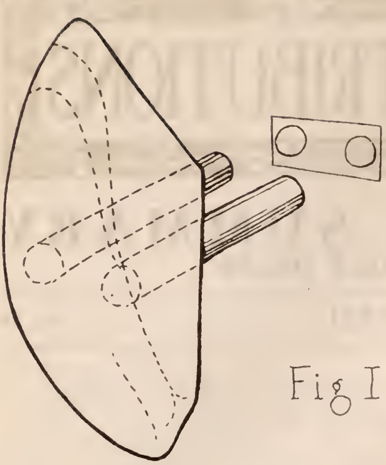

Fig I.

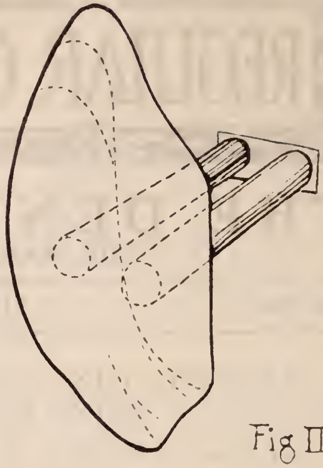

Fig II

pin to the other to strengthen it if necessary. The gold solder used may be of a low karat so that it will not be necessary to raise the temperature of the facing to a high degree in order to flow the solder. Then remove the investment and grind down the gold and solder so that it is only as wide as the thickness of the pins, (*Fig. III*), or clasp-wire of the same gauge as the pins may be fitted between the ends of the pins and soldered to them after the facing has been properly invested.

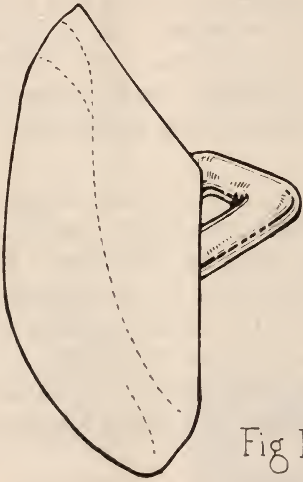

Fig III.

We shall then have, instead of two pins, a loop of the same thickness as the pins. Flow sticky wax into the loop to close it and trim it down to the thickness of the pins. This is a matter of expediency and not a part of the construction. It is for the purpose of enabling us to withdraw the facing more easily from the wax pattern for the dummies of our bridge. The wax for the dummies may be articulated and carved and the facings ground and fitted in the usual way for the case in hand.

We have, however, slots in the wax (*Fig. IV*), when it is ready to cast instead of two holes as we formerly had in the old method into which several pieces of graphite or graphite from a carpenter's pencil must be placed instead of two where we had just the two pin holes.

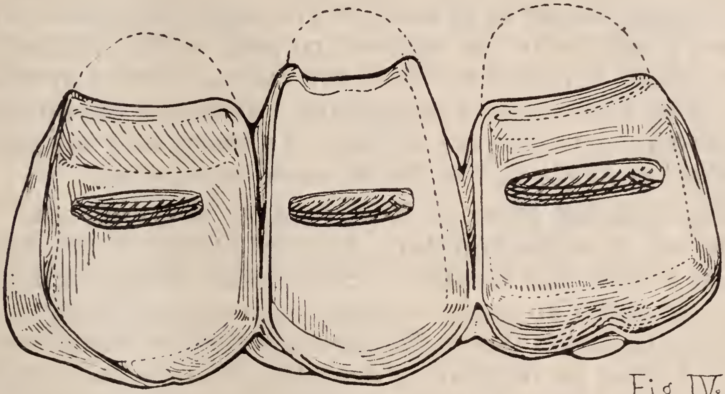

Fig IV.

We cast the gold and when we remove the investment and carbon points we have slots the width of the distance from pin to pin in the gold dummies (*Fig. IV*), and the bridge is constructed in the same manner as any bridge where the facings are to be cemented into place.

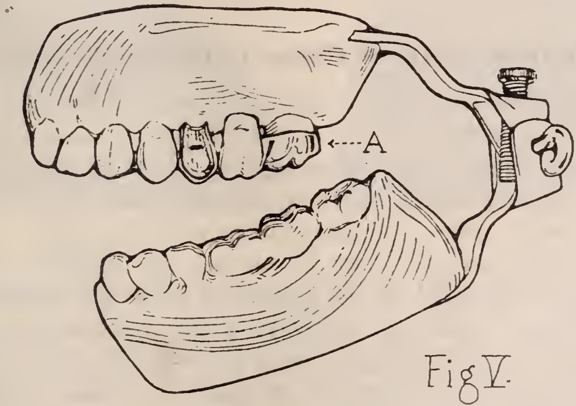

Fig V.

After the gold dummies have been cast and finished and we are ready to cement our loop facings, (*Fig. V*), we shall realize the two great advantages of a slot over the pin holes as *first*, we can work the cement into the slot by beginning at one end and flow it the entire distance across with no fear of trapping air bubbles in the bottom, and *second*, the facings cannot come loose because the cement flows into the loop formed from the pins. Any form of the pin which deviates from straight lines will give greater friction and consequently better retention. For instance, we can bend the pins at right angles toward each other provided they are of sufficient length and make a better retainer in this way, or we can thread them or put a head on them. If we use a head, the hole into which we are to cement the part must necessarily be as large as the head on the pin, but it will form a better retention than if the pin is a smooth cylinder throughout its entire length. The surface opening should be as small as will admit the retainer, in whatever form it may be or for whatever purpose, as this will give us the greatest amount of retention. So in this method we have overcome the weakest point in this class of bridge-work. It has not been the purpose of this description to compare this kind of a bridge with any other kind of a bridge but simply to describe the mode of retention.

Friction holds our cemented facings and our inlays in place. It also holds our suit of clothes together. It gives strength to the wire cable and forms a broad field for study. So we must obtain friction on the walls of the cavity to retain our inlays and cemented facings. Before considering the subject thoroughly, we might think we would not obtain sufficient friction for retention of our inlays where we use a groove instead of a small hole and still use a small post when we wish to do so, but besides the friction given by the cement, the post fits the groove on two sides and the groove is cut across the line of force caused by mastication. For instance, in the case of a mesio-occlusal or disto-occlusal cavity the groove would be cut buccolabially.

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CAST GOLD DENTURES*

BY O. W. LILLY, D.D.S., WELCH, W. VA.

THE CAST (MODEL) IS MADE from some material harder than ordinary model plaster, such as Weinstein's artificial stone or Spence's plaster. After it is trimmed to desired shape it is given an even coating of sandarac varnish, using a camel's hair brush.

When thoroughly dry, it is coated over lightly with vaselin, then a sheet of Solbrig's casting wax is adapted over the model and pressed to place so as to form a perfect adaptation. This can be accomplished best by means of cotton rolls dipped in warm water. The wax is then trimmed to the proper plate-line and the rim and lugs if desired are built on with wax.

The case is now ready to attach the wax sprues, which are made of narrow strips of Solbrig's wax, and are attached on the alveolar ridge and palatal portions of full cases. The loose ends of the wax sprues are now brought together at a point directly over the palatal portion, thus forming somewhat of a pyramid as seen in *Fig. 1.*

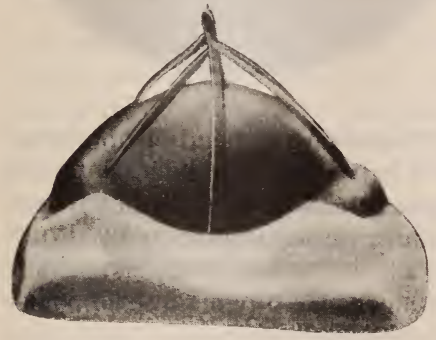

Fig. 1

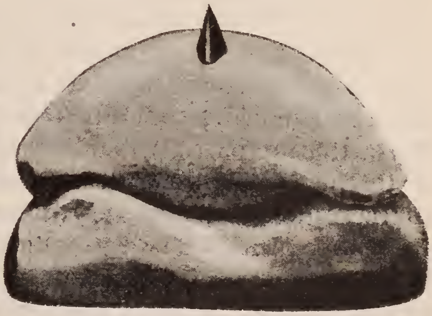

Fig. 2

The model is again coated around the plate line with vaselin, and the case is now ready for the initial investment. For this a rather thick mix of Taggart's inlay investment compound is made and painted over the case and built up over the sprues in somewhat of a conical shape and is also allowed to extend out on the model slightly beyond the plate line. (*Fig. 2*). When this investment is thoroughly set it is trimmed as seen in *Fig. 2* and the investment including the wax form for the case is then removed from the model. (*Fig. 3*). This can best be accomplished by the use of a thin knife blade and by gentle manipulation with the fingers.

The wax form and initial investment, thus removed, are now ready for the final investment in one of the large rings of the Burn's dental casting outfit. For this a normal mix of Taggart's inlay investment compound is made. The ring is filled three-fourths full. The exposed portions of wax-form on the initial investment (*Fig. 3*), is now painted over with the investment compound and embedded in the investment compound in the ring, then when thoroughly set, the completed investment is trimmed as seen in (*Fig. 4*), the following points being noted: *First*, that no part of the investment is left to stand as high as the rim of the ring; *second*, that the depression or crucible part of the investment at the center of the ring is trimmed down so as to individually expose each wax sprue. The case is now ready to heat up and cast, using a Burn's dental casting machine, with an air pressure of 25 to 30 pounds for large cases, and 15 to 20 pounds for smaller ones.

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*Given as a clinic West Virginia State Dental Society, April 1921.

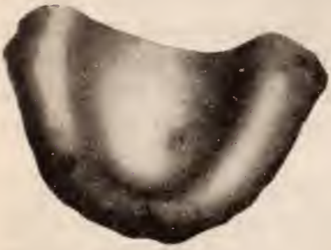

Fig. 3

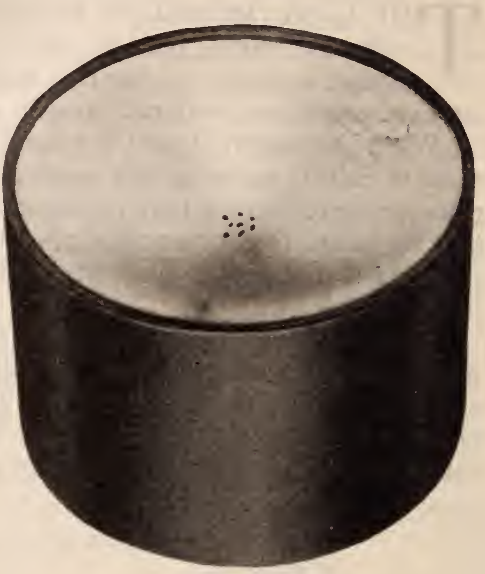

Fig. 4

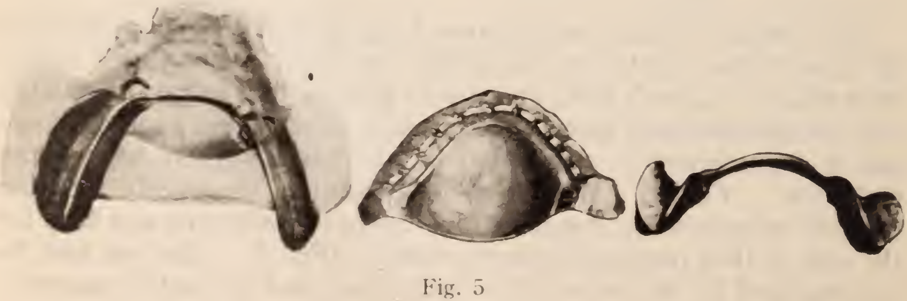

Fig. 5

By use of this technic the following castings can be accurately and easily made: Cast gold bases for full upper and lower dentures, lower lingual bar cases with bar and saddles all cast in one-piece, partial upper cases, and saddles of any size and description.

It sometimes happens, due to a shrinkage of the gold in casting large cases, that the finished casting will not fit the original model (which has been preserved, and as before noted is made of a hard material) accurately. This can easily be remedied by swaging the finished casting directly over the original model using one of the swaging machines. However if the case is properly handled during the process of heating up, burning out the wax, casting and cooling of the case there will be no good reason for a misfit.

Fig. 5 shows some castings made by the above technic.

Welch, W. Va.

WAX ELIMINATION*

BY K. W. KNAPP, D.D.S., KANSAS CITY, MO.

(Continued from page 477, JUNE SUMMARY)

THE VARIOUS STEPS UP TO THIS POINT in the casting process have been performed with the object of producing a correct pattern for reproduction in metal. There have been chances for error in the preparation of the cavity, and also in the manipulation and carving of the wax to correct form. These chances for error are, however, under the control of the operator, and can be avoided by careful, thoughtful workmanship. This may be demonstrated by preparing or having prepared an accurately-measured and accurately-cut cavity in a steel mold. Any first-class machine shop can so prepare a cavity of a given type in a bar or block of steel so that micrometer measurements may be made of it and subsequently of wax patterns made from it. In a number of experiments made in this way it was found that, using the wax technic herein before described, wax patterns could be produced which were correct so far as micrometer measurement showed. This being true therefore it follows that any error in the casting made from such a wax pattern must have come in the further steps. In other words, in making an inlay, it *is* possible to produce an accurately-fitting wax pattern for a given correct cavity.

The pattern is then invested in a material which completely and perfectly surrounds it, and which shows neither expansion nor contraction when the mold is closely examined with a high power glass after the investment has set. It is then reasonable to believe that, so far at least, there is no error. If this be granted, then any error which is present in the resultant casting *must* have come in the last two steps, namely in the elimination of the wax from the mold or in the actual casting of the gold. It is my honest belief that in the process of elimination of the wax from the mold will be found the cause of the majority of misfit castings. This is usually done by what is called the "burning out" process and there are two variations of practically the same principle employed. By the first method the mold is subjected to a low temperature for a short time to cause the wax to melt into the investment material. The heat is then raised causing the wax residue to first carbonize and then, as the high heat is continued, to volatilize and leave a clean pattern chamber. According to experiments made by Dr. Price, the results of which were tabulated, it was found that when thinly-mixed plaster was heated, it began to disintegrate at 350 degrees Fahr. when the point of dryness was reached. Thickly-mixed plaster begins to disintegrate at 400 degrees Fahr. under the same conditions. In a series of tests made by the writer, a number of patterns were invested, the investment allowed to set, and the end cut into so that the wax pattern might be seen and its dissipation studied. The ends of pyrometer wires were then clamped to the side of the ring and insulated from the clamp by mica so that an actual temperature reading of the ring itself might be recorded. The flasks were then heated slowly at first, and then with a higher flame and it was found in ten tests that the wax was first entirely volatilized at a temperature varying from 900 degrees to 1000 degrees Fahr. on the outside of the ring, depending on the size of the wax pattern. Now practically every investment compound on the market contains plaster in some proportion as a binder. Is it not then reasonable to believe that when the material which acts as the binder in an investment compound is heated from 550 degrees to 600 degrees Fahr. beyond its disintegration point that there is bound to be distortion of that investment compound when pressure is applied to it?

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*The fifth of a series of articles on Casting Technic, written exclusively for THE DENTAL SUMMARY.

If this be true here is one great chance for error, since the gold thrown with pressure against the weakened walls of the pattern chamber causes them to give and bulge and thus produce a warped casting. This occurs so frequently that this method of burning out *must* be discarded if uniformly correct castings are to be obtained. The second variation of the burning out process also employs a first low heat to melt the wax and soak it into the investment compound. The temperature is then raised to a point varying from 300 degrees Fahr. to about 600 degrees Fahr. depending upon the technic employed. If the lower heat is employed it is maintained for a considerable length of time, and the higher temperature for a shorter period with the idea of carbonizing the wax residue on the inside of the pattern chamber so that it may be cast against.

In a study of this method it would seem that there are chances for error again; not so much as by the former method but enough to make it difficult to get uniform results. In the first place it does not seem logical to soak melted wax into investment compound by applied dry heat and expect an ideal surface to mold against. Certainly no one in making a denture would soak the base-plate wax into the plaster by heating the flask with dry heat until the wax was carbonized, and then proceed to pack with rubber, close the flask and vulcanize. The result would inevitably be a warped denture. In the second place how is it possible to obtain the same degree of carbonization by applying the same temperature for the same period of time for markedly different size wax patterns? When low heat is applied to an inlay mold the wax in a short time melts and begins to penetrate the investment. It will be noted (by watching an investment pattern opened at the top of the flask as described above), that the pattern seems to sink downward and to the sides leaving the top cup-shaped. Apparently gravity is causing it to sink toward the bottom as we would naturally expect. As a consequence there is a greater bulk of residue wax on the bottom of the pattern chamber than at the top or sides. There will as a consequence be a thicker layer of carbon at the bottom when further heat is applied. If a large sized piece of wax such as a Taggart cone be invested and carbonized to a point where the pattern chamber be dark brown in color when cut into, and if the walls of the pattern chamber be closely examined with a high-power glass, it will be noted that there is actually a piling up of carbon on the walls, and especially on the bottom wall.

Now if in preparing the mold for casting by this carbonization method the mold is carried only to this point, we should expect to find that the casting would be short or scant by the thickness of this carbon layer in *addition* to the loss of dimension caused by the contraction of the gold. For gold and carbon cannot occupy the same space at the same time any more than any other two bodies can. It has been explained that the carbon acts as a flux and the theory is beautiful, but yet we know that if we do not want solder to flow beyond a certain point, as for instance in adding a solder contact point, it is only necessary to rub on a carbon pencil or Anti-flux as a limiting line and the gold solder will not flow over that line. Since "flux" means "flow" it would seem that this theory, while plausible, is a bit inconsistent. Therefore if the wax residue is under-carbonized there is a chance for error.

Again if we have a very small wax pattern, as for a gingival cavity, there would be a tendency to over-carbonize if sufficient heat for a long enough period of time were used to properly carbonize a large pattern, such as a full-cast crown for example. In other words, it would seem that the temperature and time should vary in each case, depending upon the size of the wax pattern, if uniform results are to be obtained. This is obviously impracticable, and as a result there *is* a variation in castings so produced and again chance for error. And finally, in the burning out method it is necessary for the mold to become dry to properly carbonize the wax. As I understand the composition of a "green" inlay mold, there is contained a wax pattern surrounded by a mixture of investment material and water. This water is of two types. First the water of crystallization which is a chemical part of the mixture, and a free water or excess water which is a physical part of the mixture. The water of crystallization causes the "set" of the material and is necessary to its integrity. Therefore, the water of crystallization should be maintained in the central portion of the mold, or, in other words, in the investment compound immediately surrounding the wax pattern, if the greatest degree of strength is to be maintained. So long as a plaster cast or the plaster in the walls of a room retains its water of crystallization, it will endure, but if we turn the flame of a blow pipe on the plaster wall, and drive off the water of crystallization it will crumble and fall off. If therefore, an inlay mold be subjected to heat, even of a moderate degree, (after the water of crystallization has been driven off) certainly it is not beneficial to the investment compound to say the least. And the longer it is heated after that water of crystallization is gone, the less integrity will it have.

So, it would appear, here is another chance for error. It is by no means denied that many beautiful results are being produced by many men, notably Taggart, Morris, Hollenback, McCullum, Tinker, Maves and many others, which would seem to indicate that this method was ideal, and in their hands it appears to be.

The fact remains, however, that there are apparent chances for error, and that if we are to bring dental casting to the point of perfection it should reach, we should try to eliminate any such possible chances. The castings for dental purposes which are perfect from the standpoint of micrometer measurements are yet to be made, and while that point may never be reached it should be our one and earnest endeavor to at least approach it as nearly as is humanly possible. It is with that purpose earnestly in mind that the following technic is presented with the sincere belief that it may be another step toward the goal.

Since melting the wax into the investment material, thus necessitating the carbonization or volatilization of the film of wax left on the surface of the pattern chamber, seems to be undesirable in that it allows many chances for error, why is it not more logical to remove the wax in its entirety? Then there would be nothing left to volatilize or carbonize with the consequence that the mold need only be dried to allow of casting into it. Since washing wax from plaster or plaster compounds by means of boiling water is the accepted method in other dental prosthetic procedures, why not employ the same method in the case of casting? We have the same materials, wax and plaster. It only remains to employ a technic for washing the wax out completely and in a manner that will not distort or break up the surface of the pattern chamber. This can be easily accomplished by making use of a natural phenomenon we have probably all observed. If a few drops of water be shaken off the finger tips onto the red hot lid of an old-fashioned cook stove, we know that those drops of water dance and run away from that hot lid to a cooler portion of the stove and then flatten out, simmer and evaporate. Moreover they run away from the hot lid as *real spherical drops of water.* If the ring of an inlay flask be heated quickly and uniformly just after the investment has set, so that the ring becomes as the super-heated lid of the stove, the molecules of free water in the investment compound will run away from that ring just as the drops of water run from the hot lid. If the ring be heated on all sides simultaneously these molecules of free water can go only toward the center of the flask, and then they must find means of exit through the open ends of the flask. These molecules of water are hot and coming in contact with the wax pattern in the center of the flask they soften the wax so that it becomes fluid. More hot water coming in from the outside, and out through the ends, picks up this fluid wax with it and washes it out through the place where it finds the least resistance, namely through the sprue hole. Still more hot water coming in from outside fills into the pattern chamber which now has relieved itself of wax, and washes it throughly so that if the mold be cut open after this process has been going on for two or three minutes, it will be found that the wax has been removed completely, leaving a pattern chamber clean, white and with walls and angles undisturbed by this passing through of water. I am speaking now of a case where an investment compound of such a type as I have before described is used. Many will not stand this treatment at all of course.

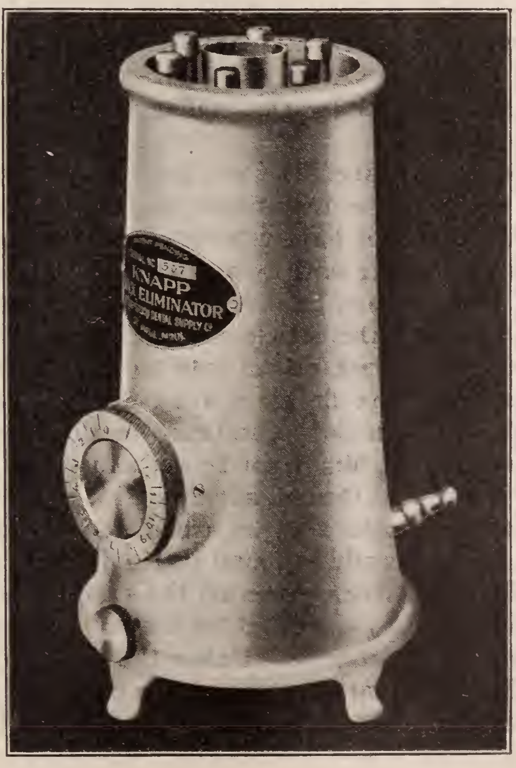
We have thus accomplished the complete removal of the wax at a temperature not to exceed 212 degrees Fahr. the boiling point of water. It does not matter whether the pattern be large or small the result is the same. It remains now simply to rid the mold of *free* water and the casting can then be made. This free water can be removed by slowly evaporating at a temperature of 120 degrees Fahr. for several hours, or by placing in an oven at 380 degrees Fahr. for about forty minutes, or by continuing to heat the ring correctly for five to six minutes.

We are told that plaster undergoes several changes as it crystallizes. One is the initial set, another takes place in about an hour, and others at intervals for some time; perhaps several days. If this be true, the logical thing would seem to be to get our casting done within the first hour. If it be placed in an oven and allowed to remain until it is thoroughly dry, there is danger of slight distortion even at 380 degrees Fahr. due to the fact that the water of crystallization is removed. If the flask be left in the flame for five minutes after the water stops flowing out, several advantages are gained. In the first place, I believe there is a more uniform expansion. If a blacksmith wishes to fit a wagon tire to the wheel, he uses one that is slightly smaller than the circumference of the wheel so that it won't quite go on. He then heats the tire so that it expands enough to slip over the wheel and when it is cooled it contracts and fits tightly. In the case of dental casting when the ring only is heated, it expands quickly allowing the layer of investment compound next to it to expand freely. As the flask becomes hotter the same free expansion can take place laterally as well as vertically, so that the whole mass of investment compound can expand from the center equally in all directions; thus giving a pattern chamber which is slightly larger in all directions than the wax pattern was. If this be true, and the results seem to show that it is true, there is an opportunity here to compensate for the slight contraction of properly-heated gold so that the resultant casting is more nearly exactly the size of the wax pattern.

In the second place, if the flask is correctly heated for five or six minutes in this manner and removed *while the moisture is still present in the center of the mold,* it will be found that the temperature in the center of the mold is about 220 degrees Fahr. and the water of crystallization is still present in the walls of the pattern chamber as shown by the moisture deposited on a mirror held over the sprue hole. Thus, at this stage the investment compound forming the pattern chamber walls still retains its original integrity. Of course it would be impossible to cast into a mold containing moisture, so we simply set the mold aside for a minute and test it with the mirror again. This time we should find no moisture on the mirror. This shows that there was sufficient heat deposited in the ring and the outer layers of investment to slowly, evenly, and uniformly dry the mold to its center without the application of further heat. When the flask is first removed from the flame, if the ring be touched with a wet finger there will be no snap or sizzle, showing that the heat is still going inward. If the same test be made in a half minute after the removal of the flask from the flame, there will be a snap or sharp hiss showing that now the heat is radiating outwardly. This radiating heat seems to bring with it the remaining free moisture thus giving a pattern chamber which, if the process has been carried out correctly, has given up its free moisture but not necessarily its water of crystallization. The outer layers of investment have no doubt been overheated, and have lost both free water and water of crystallization but apparently not enough to cause distortion or cracking. At any rate the pattern chamber itself is the part which gives us a correct or incorrect casting and if *it* be undisturbed we needn't worry about the rest. If you will carry a mold to this stage and then cut into it with a knife, it will readily be seen how hard and apparently unchanged the center of the mold is.

The third advantage of this method is the saving of time. If we can accomplish equally good results, to say nothing of better ones, in seven or eight minutes as compared to an hour or an hour and a half as used in some methods, certainly we should be foolish to use the longer method. Castings made by this method using M. O. D. preparations in porcelain teeth, and then splitting the tooth so that marginal and surface fit can be perfectly seen, show more nearly perfect adaptation than I have been able to obtain in other ways. Three-quarter inlays and even full circle castings seem to seat more nearly and easily than when other methods of wax elimination are used. I believe this is partly due to the fact that the expansion is more nearly uniform, and partly to the fact that the investment retains sufficient strength to resist (somewhat at least) the tendency of the gold to contract.

The wax may thus be eliminated from the mold by holding the flask, with the spue hole down, with a pair of light pliers over a Bunsen flame in such a manner that the flame strikes the ring only, and rotating the flask so that it is heated more or less evenly on all sides. This becomes somewhat tedious when continued for seven or eight minutes however, and requires personal attention with the consequent variations to be expected from the entrance of the "personal equation" into the process. Inasmuch as the heat applied is comparatively intense, a variation of one minute's time in heating causes a marked difference in the condition of the flask. In an effort to standardize the procedure a device for performing this process uniformly and automatically was conceived and finally perfected. It is called a wax eliminator, and is illustrated herewith. It consists of a body or case containing a clockwork mechanism for timing; a gas inlet to a gas chamber from which extend upward tubes with small orifices extending inward in such a manner as to distribute small flames uniformly on all sides of the flask at once. The flask being thus heated gives up its free water which



flows out the sprue hole which is placed downward, carrying with it the wax and dropping into a drip cup which is removable for cleaning. A dial marked with numbers corresponding to minutes is turned to the correct number (usually No. 7 or 8 depending on the gas used) which, when released, starts the timing mechanism. The lower knob is then turned till it latches, thus turning on the gas which is ignited by a pilot light kept burning if desired. It is then left to itself since it is provided with an automatic shut-off which turns off the gas when the proper time has elapsed. The flask is then removed and tested for moisture. There should be a light film of moisture on the mirror at this stage. It is allowed to set for one minute and again tested with the mirror. There should be no moisture at this time. Touch with the wet finger and, if there is a distinct snap or hiss it may be placed in the casting machine and cast immediately for simple types of inlays or cases where metal is to be picked up in the casting. For compound or complex castings I believe it preferable to allow the flask to cool till it can be picked up with the fingers. The same principle of wax elimination is used for cast clasps, small or large saddles, or full dentures. In these larger cases of course it will take a longer time to dry the mold depending on the size of the flask used. The size of the patterns makes no difference as above stated for the boiling water treats the patterns all alike.

This method of eliminating the wax in its entirety was first demonstrated by the writer at the Iowa State meeting in May, 1919. Since that time certain clinicians have advocated placing the flask in a pan of boiling water and boiling until no wax appears to be issuing from the sprue hole. If two patterns be invested and carried through, *first* by the method advocated in this article, and the *second* by boiling in a pan of water, and then the flask be cut into so as to expose the pattern chambers in the respective flasks, it will be found that their appearance is quite different. In the second case usually there will remain a slight film of wax. This film must be carbonized by further heating after the mold is dry and thus all advantage is lost. If wax, even in a thin film be left in the mold and not completely carbonized, when the casting is made it will usually be found with a depression just under the sprue, and with one or more places on the casting showing imperfect margins. This is due to gas formed by the hot gold striking raw wax or under-carbonized wax residue. Unless the wax be completely eliminated uniformly correct castings may not be expected.

3520 Broadway.

THE ESSENTIALS FOR DENTAL ROENTGENOGRAPHIC INTERPRETATION*

BY WILLIAM A. LURIE, M.D., NEW ORLEANS, LA.

(Continued from September Number)

Our illustration (page 743, September SUMMARY) indicates why a root canal and pulp chamber become visible. Let us take it as a tooth structure, not quite a circle. The illustration defines two complete and perfect circles. Between those two circles, or between the outer limitations of the crown of the tooth (the outer circle) and the illustration that represents the pulp chamber, we find a dense mass of bone. Within the inner circle we find a mass of soft material of easier penetrability. A ray coming directly through the center will therefore register that difference in penetration. A ray coming at the level of the upper and the outer edges of the circle as you see it would be that ray, or that bundle of rays, which outlines the extent of our object, in this instance the tooth, on the film. There are also rays that penetrate that area directly on a tangent to the inner circle, or, in this instance, directly on a tangent to the pulp chamber. Those rays that penetrate at a tangent to the pulp chamber, and which are indicated as the line 2 on the picture, are those rays which meet the greatest resistance. Their resistance is greater than the resistance of the ray that penetrates through the center of the tooth, or in the position of the pulp chamber, for the distance from A to A is greater than the distance at B. Therefore the diameter of the circle does not have the resistance equal to that of a line through the tangent of the inner circle. This is, in a homely way, the illustration of why the root canal becomes visible within the dense body of a tooth.

There is another feature that we can take up just at this moment; (it is perhaps a little bit advanced) of how one may determine a tooth that never has had any surgical assault, that may determine the vitality or non-vitality of pulp. The determination is made because of this: A vital pulp has a circulation within it. That circulation carries away some of the rays that have an impulsive force or a registering force upon the film, and therefore in the developed picture that area within the pulp chamber of a vital pulp shows a greater resistance than that where there is a pulp without circulation. That difference in the resistance due to circulation is just sufficient to make the difference between a sharply defined root canal and pulp chamber and one that is not so sharply outlined, is shaded away and is smoother in its outline.

The diagnosis which we will take up later is the point that correlates all that you can see in your X-ray pictures, and brings it up to your understanding and your knowledge of the anatomy of the part. You must be able to talk in values or think in values of penetration. You must apply values of penetration to the existence of a tissue. You must know whether that tissue is in its normal position, and exists normally in extent, or whether its extent is pathological and its position is pathological. That of course rests purely with your knowledge of the anatomy of the parts.

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*Stenographic report of a lecture delivered before the West Virginia State Dental Society, April, 1921.

The position for picturing dental areas is an important feature, and is one on which I want to spend a moment, because I believe that the present-day idea of having to search for an imaginary plane on which to focus is fallacious. Your best picture, that is, your shadow picture —and in this respect your penetogram is a shadow picture—is cast upon a screen in a perpendicular manner. Any variation from the perpendicular onto the screen has the effect of either distorting or blurring your image. Therefore the best pictures are those which are taken with the light focused perpendicularly upon the screen, irrespective of the position of a tooth. The amount of elongation, if any, or the amount of foreshortening, if any, is a matter for your own determination, and does not detract from the value of such a roentgenogram when a diagnosis is attempted.

It would be too constricted to have the field of dental roentgenography limited by our determination of the size and length of teeth, and perhaps the length of a root-canal filling necessary to fill a certain root-canal. It is more necessary and a broader field for the X-ray to determine the pathological condition. Therefore the pathological condition is best portrayed by the proper application of the force, and in this instance the proper application of the force is perpendicularly upon the plane of your film.

When such pictures are taken as I described perpendicularly upon the film, it will be noted that where a portion of the tooth structure is near the film, that portion is clearly outlined, distinct and sharp in its outline. As the portion of tooth that we are studying or viewing is remote from the screen, it loses its clearness of outline and sharpness of detail, and becomes a rather feather-edged outline. This is analogous to the portraying or making of a shadow by the putting of an object close up to the screen and of taking it farther away. When the object is close up to the screen, we will see that it has a rather clear-cut well-defined outline of the part as it really appears, as to proper size and proper shape; but as we leave the screen and approach the light, that shadow becomes enlarged, the outline is feathered, and its form is never proper. Taking this point in conjunction with determination of X-ray pictures, we find that in an X-ray picture taken as I have described, that portion of the tooth that lies to the lingual side is clearly outlined upon our screen.

The force of X-ray is the same as any other force. It is non-destructible. It is only limited by the force with which it started, the force behind it. If we have a mass of small molecular texture and greater atomic weight, and we have a shaft of light penetrating that, we do not destroy this material that the light penetrates, but what happens is the movement of those molecules, those atoms, to permit that shaft of light to penetrate through. And it is that shaft of light that *gets through* that registers, whereas that shaft of light that hits against atoms and has to go around or move them apart, meets with a greater resistance and consumes a longer time in getting to the film. If we have a picture that is taken at a definite time of exposure, you can immediately see that if that screen is exposed for three seconds, that

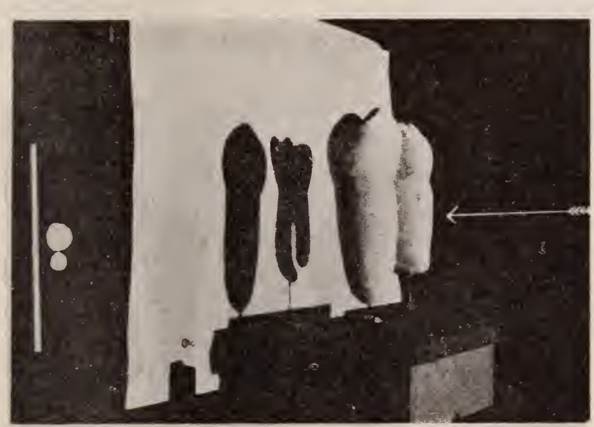


Fig. 2—Portrayal of the shadows cast by two plaster casts representing a bicuspid and a molar tooth. The models are in a plane parallel to the screen and the light force is from a perpendicular plane. The outline of these shadows is equal throughout. The form of the shadows shows no distortion. All dimensions are proportionately equal.

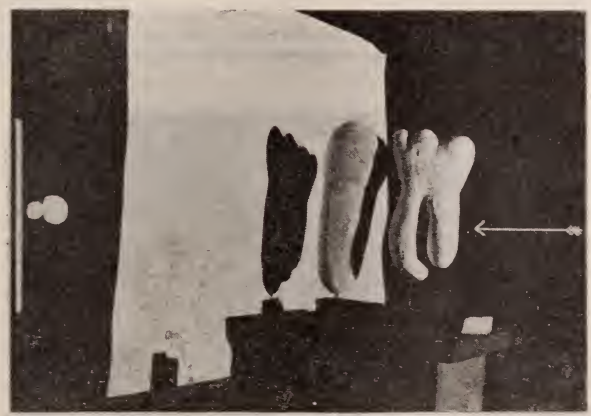


Fig. 3—The relative positions of the models and the screen is altered in this illustration. The plane of the models is one almost perpendicular to that of the plane of the screen. The direction of light is unchanged. Attention is directed to the altered appearance of the shadows, also to the difference seen in the outline of the shadow to the left of the picture, and that to the right. The margin to the left, which represents the outline of the bicuspid model on the side is clear cut and sharp whereas the margin which represents the outline of the molar model on the right side, is not as sharp. The relative disproportion of foreshortening can also be noted.

that shaft of light that goes through between the molecules will get there faster, and more of the rays will register than those which are obstructed by the atoms and have to move these various atoms apart to get through; these will be delayed, whereas those that get through quickly get through in greater numbers. If your light is cut off at the end of three seconds, there is no more force behind the rays. The only force or effect they have is the movement of those atoms possibly to the extent of their own force, but not any power of registration.

Our knowledge of diagnosing X-ray pictures depends upon our knowledge of bone anatomy and the relation that the various anatomical

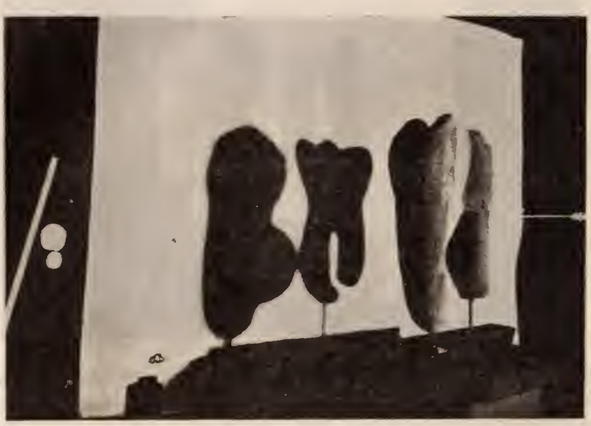


Fig. 4—Attention is directed to the change in the appearance of this shadow made by the same models, to which a third subject, a round piece of wood had been added between the models of the bicuspid and molar teeth. The subjects are in a plane perpendicular to light force while the plane of the screen is altered. The molar end is nearer the screen than the bicuspid. Attention is directed to the shapes of the models and the difference in sharpness of outline as seen in the shadows to the right and left.

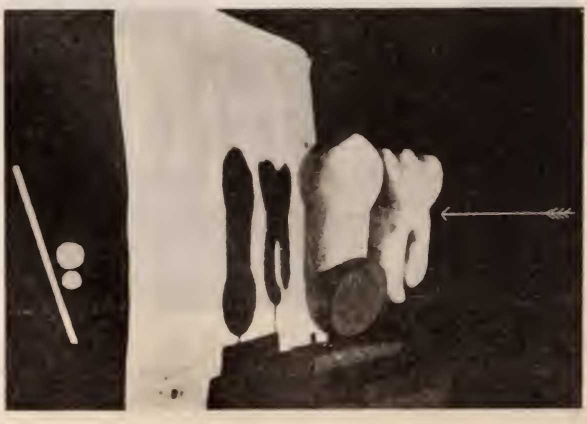


Fig. 5—This illustrates a reversal of the relative positions of light force models and screens. Attention is more particularly directed to the appearance of the circle of wood. Instead of a round appearance it is distinctly elliptical.

structures about the jaws bear to the areas pictured. This has been shown by knowing the extent and the relation of the alveolar process to the soft tissue, and then both of these to the denser bony structure or compact bone, as teeth. Then again we must remember the bony cavities and the situation of the different varieties of alveolar tissue. A really true diagnosis associates what we see and what we interpret in the terms of penetration, with our knowledge of the anatomical condition.

From the appearance that we get on an X-ray picture we can divide the conditions into the acute and the chronic, and the acute can again be subdivided into infections and irritations. The infections and irritations are again subdivided, such as infections of local origin, from impacted teeth, poor root fillings; or, secondary, an extension from a

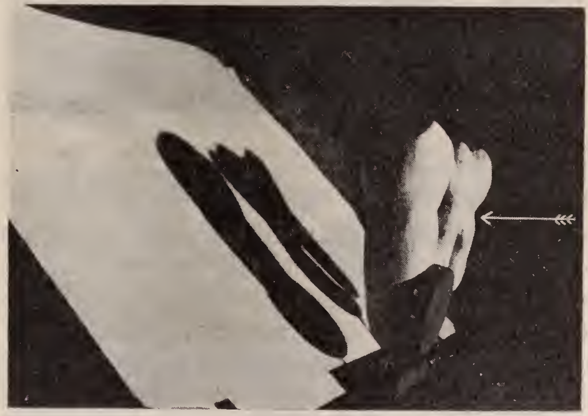


Fig. 6—In this illustration the distorting effect of shadow picturing onto a tilted screen can be noted. Attention is directed to the sharpness of outline at the lower portion at which the screen is in close approximation, and the featuring and enlarging effect produced at the upper end where the screen is more distant.

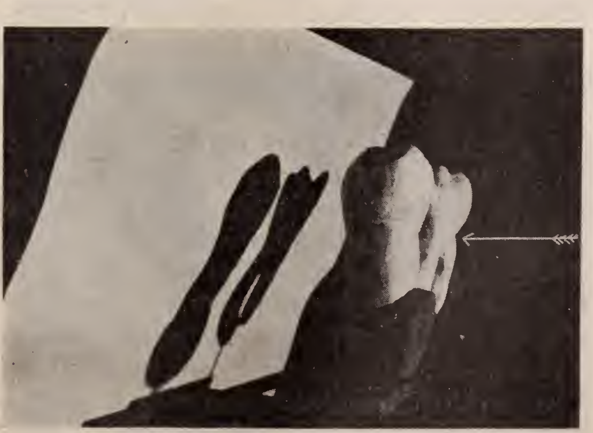


Fig. 7—This illustration is the reverse of the above. Note the clearness of outline above and the feathering below in the shadow.

neighboring process, or from penetration of an instrument during operation. The irritations are due more likely to foreign bodies and to impacted, unerupted teeth that have not reached the stage of development that permits of infection through the teeth.

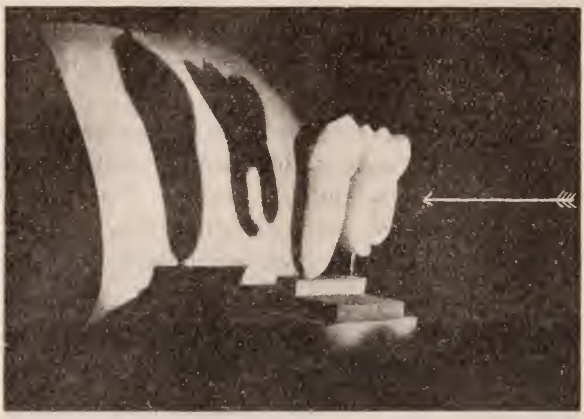
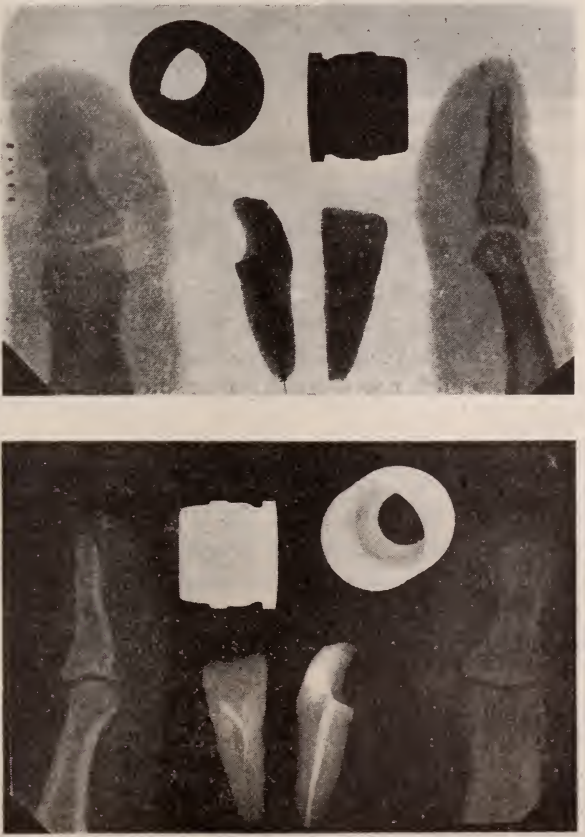


Fig. 8—The distortion due to both ends of curving away from the subject is here illustrated. This effect is often produced in dental roentgenography by the patient applying the finger too strenuously to a dental film in an attempt to retain it in position.

The primary causes are divided in the same manner, first as infections, and second, irritations, and under infections there are the primary and also the secondary. Under the primary infections we can trace such to infected root-canal filling material; some forms of pyorrhea, while pyorrhea may also be associated as a secondary condition, due to some general bodily infection or body condition. Also the secondary infection might come from a fistula from some distant infection, or a sinus which empties into the area we have pictured.

Under chronic irritations we have, of course, unerupted and impacted teeth again. Under this heading also we find occasionally the unextracted deciduous teeth which have remained in place; a portion of broken root, all of the deciduous or the permanent tooth variety; pieces of instruments that had broken off and become healed over without infection.

A piece of sterile instrument may remain a portion of the human anatomy for some time. One of these incidents was quoted to me a few days ago in Chicago in connection with the idea of focal infections. A friend of mine, apparently healthy, who had been a healthy and robust boy, went on to manhood and it was difficult for him to get life insurance. He had a high blood pressure. There did not seem to be any cause for the high blood pressure. He was examined physically by a number of men. He had his mouth examined and no infection was found, but it was evident that there was a toxic focus somewhere in that man's body that was just of sufficient moment to raise his blood pressure. One day recently he accidentally slipped on the ice, and a heavy fall caused him to have considerable pain over his hip, for which he sought medical advice. An X-ray picture was taken. No fracture was suspected, but it was thought perhaps the pain was due to a necrosis that had developed somewhere. Imagine the surprise when an irregular shadow was found to the outside of the hip bone, and upon operation it was found to be a small stone that had become encysted in this area, perhaps during his childhood through some fall or accident. I questioned him closely and he did not remember any such incident or occurrence, but here was an encysted stone which for years, (for he is now a man of forty-two) which for an unknown length of time had been in his body, and had given no trouble until the accident had caused either the rupture of the encysting membrane, or the blow had caused an additional necrosis which caused a greater amount of fluid within that sack in which the stone was lodged, and his symptoms were sufficient to cause him to seek relief. Curiously enough, immediately after the removal of that stone his blood pressure dropped from 170 to 140 within three days. This was too recent to tell the ultimate results, but how singular that that amount of increased blood pressure should be caused from such an incident.



The negative and positive prints of substances commonly encountered in dental roentgenographic portrayal.

That is similar to your focal infections about the teeth. I have in mind a piece of a nasal saw that had been broken off in the course of an operation on a patient I saw in California last summer. The diagnosis was very difficult until it was determined to be a piece of saw. The woman had lost an upper right first molar because of the pain about the molar, but in the original picture that piece of saw had not been shown. Subsequently that foreign body was removed, and the patient has had complete relief.

The positive print of substances indicating a difference in their penetration.

It is also possible to diagnose the age of a patient through X-ray pictures. You all know what changes take place in the mouth from the time of the eruption of the deciduous teeth and primary teeth up to the time of the formation of the permanent teeth, and also the changes from that time on until the full development of the permanent set of teeth. At each age your X-ray picture changes. You would not say that a picture in which the second molar showed an incomplete root formation, periapical formation, was the picture of a man of forty. Likewise, you would not say that where the second molar roots are completely formed, that is a picture of a child of eleven. So that your diagnosis as to age can be made from the study and appearance of your X-ray pictures, if carefully taken and noted.

Lesions also divide themselves into congenital lesions and acquired lesions, but that is the regular tabulation of any lesion such as you might discover physically as well as attempting to discover roentgenographically.

The great part in diagnosis is the correlating of what you have found, of the penetration of light or the registration of light force, to what you know to exist anatomically. If you cannot do that and do not do that, you never will be able to make a diagnosis as to the condition that you see. To say that you see or do not see pus is quibbling over a question which you had better answer by saying you see greater or less penetration; to make your terms of the entity as it regards penetration, and not as it regards a definite condition that you are attempting to diagnose. To cover the field of dental X-ray interpretation would be a matter of a number of days, if I were to give you all that I possibly could give. The time allotted has been rather short, and I have attempted to do what I could in it.

QUESTION: Is it possible to determine pus in the dental area by the X-ray alone?

DR. LURIE: As pus *per se,* no. As an area in which there has been a destruction and in which there is a debris which we may consider pus, yes.

QUESTION: Last year you told us you would tell us how to tell the difference between a person that had syphilis and one that had not.

DR. LURIE: I told you I was working on it. I believe there is a possibility, and I believe there is a greater possibility now than there was a year ago, but it takes a long time to be positive in making such an assertion. I believe it is possible to differentiate from an X-ray picture a case of tuberculosis and a case of hereditary syphilis. I believe those two conditions can be determined. I am not ready yet to say positively to the extent of a proportion of cases that might be said technically yes or technically no. But the difference is in the character of the alveolar process. In the tubercular patient there is a notable loss of calcium content. They must necessarily in their treatment be fed calcium to overcome the tubercular condition. Calcium is being robbed from the other tissue of the patient's body, and is being equally robbed from the alveolar tissue, and we get the impression of alveolar process that is poor in calcium salts. That means that the alveolar process is more easily penetrable. The haversian canals themselves, each individual canal, shows a little more soft tissue in it, and the walls are a little thinner. In hereditary syphilis we have the opposite condition. There is a thickening of bone tissue generally throughout the body, and the alveolar process comes in for its share, and we get that thickening, which can be recognized by a loss of space of haversian spaces between bony walls, and the thickening of those bony walls as against the normal and as against the tubercular. Just to what extent and in what proportion we are going to find that I am unable to say at this time. But that is a line along which I am working, and I hope at some day to have more definite data on it.

DR. WALKER: I have been very much impressed with the talks just given. I have been putting the cart before the horse. I believe many of us in the profession are doing that.

We get an X-ray machine, and our minds are involved with that, and we take the pictures, and when we get the picture we lack the knowledge to know what it means. I have been working with the X-ray four or five years and have been a close observer, and yet from these talks I have gotten a number of ideas that will be helpful to me.

DR. LURIE: You cannot make a diagnosis of a pathological condition if you do not know the normal, or if you do not know to what extent the normal may vary and within what limits. You must study your X-ray of normal areas in conjunction with your X-rays of pathological areas. If your patient seeks advice for a bicuspid on the upper right side which is pathological, and you take a picture, take one on the left side at the same sitting if it is normal, and compare them. If your patient has not a normal bicuspid, when your next patient comes in who has, take it. That is the only way you are going to learn pathology.

To make a diagnosis of a person's physical condition and say to him "Your teeth are all right; I do not find any dead ones; we do not have to X-ray them" is a fallacy; or to say to that patient "You have a crowned tooth here, the rest of your teeth have fillings in them, and I can see they are all vital," is a fallacy. You do not know but that an area from which you suppose a cuspid tooth was extracted during early childhood is one in which there never was a cuspid erupted. You do not know but that person has supernumerary teeth that have or have not erupted, and your ocular vision cannot tell you that, but your X-ray picture can. I urge you to take more pictures. It is not necessarily what you are doing for any individual case, but you are to offer your patients service, and they are willing to pay for service. They do not come to you and say "This is the tooth that is bothering me, and I want it filled," but they come and say "I have trouble with my mouth; treat it." And you can give them that service.

QUESTION: I had a case of a crowned tooth; the nerves were not devitalized, from some cause or other. There was no evidence that there had been any wasting of alveolar tissue. There was no pus. She had sciatica, and had had it for a year. The pathological conditions as shown by the clinic were decidedly in favor of taking out the tooth. I took the crown off. There was no odor from the tooth, such as you would expect from a tooth where the nerve cavities were not filled. The picture showed no pathological condition. Does a picture show such a pathological condition as chronic pericemenititis?

DR. LURIE: Yes, it always will. You must remember that your condition may exist on the opposite side of your tooth, on the far side of your tooth, and may not be so easily visible as it would be if it were mesio-distal. It may be linguo-buccal of sufficient moment to cause such symptoms. And your diagnosis of that is a little more difficult than where it does exist mesio-buccally, and that is where your interpretation of penetration comes in. If you interpret that as being an increase in the obstruction of light, a more difficult penetration through that root area than it should be, you have the immediate diagnosis at hand.

QUESTION: I took the tooth out, and found mesio-distally the same condition that you say would exist there, but I could not detect it on the picture, nor could two or three others who looked at it. I thought I was justified in taking it out.

Dr. Lurie: In reading a picture we often read too big an area. You must remember that the detail you are looking for is very fine. The pathological changes that do take place are very minute, and if you look at a picture, either up at the light or through a shadow box, your eyes concentrate on that whole picture, not necessarily on the root that you are attempting to diagnose. If you will take a piece of cardboard and punch a hole in it about a quarter of an inch in diameter, a nice clean-cut hole, and take that cardboard and lay it over the area you want to read, you will find in that picture a thousandfold more than you ever have seen, because you will be able to make out the detail linguobuccally of your alveolar process between and over the roots of the teeth, something that perhaps none of you have seen. You will be able to follow the outline of your tooth socket and determine apical absorption quicker than you ever did before.

Question: When I first commenced to make pictures I thought every tooth that showed what looked like a nerve canal was vital. I found some of them were not vital. How can you tell the difference between a live and a dead tooth when the nerve shows in a dead tooth and still you have no dark area in the tooth?

Dr. Lurie: Only by comparison with the tooth on the opposite side of the head, or, if that should be a cuspid, you must compare it with the lucency of a root canal in a lateral or the neighboring bicuspid. It is a matter of comparison, the detail of which I could not undertake to show this time. It is the representation of a root canal that is distinct and clear in outline, over that which is a little bit more evasive in outline and not quite as clear-cut and sharp, more diffused; that difference is brought about by the circulation.

Question: There is less penetrability in a live tooth than in a dead one?

Dr. Lurie: Correct. That is not true because of the amount of soft tissue in it, but because of the circulation, because you get soft material and debris in that canal where there is no circulation.

Question: Having a picture showing an impacted tooth, is there anything in that picture that will enable you to tell whether it is an etiological factor in systemic disturbance or not?

Dr. Lurie: An erupting tooth, as long as it is an erupting tooth with the tooth bud intact, is not an item of systemic infection. It cannot be. It is only an item that will cause pressure and pressure symptoms. However, the moment that bud reaches that amount of growth where it ruptures and can become infected, it immediately becomes a possible general toxic entity.

Question: That is as far as you would go?

Dr. Lurie: You must see the various pictures to show it.

(To be Continued).

1130 Maison Blanche Bldg.

IMPORTANT FACTORS IN DIAGNOSIS AND TREATMENT OF PERIODONTAL DISEASES*

BY C. H. SCHOTT, D.D.S., CINCINNATI, OHIO

A LITTLE LEARNING MAY BE a dangerous thing, as a satirical poet characteristically observed, but even a little learning can scarcely be so dangerous as much ignorance. The attendance at this meeting is indicative of the fact that the dental profession is awake to its responsibilities and eager for more knowledge, and that we are not going to allow ourselves to be swept into the stream of unrest, demanding more pay for less efficient services, especially if we can get the knowledge quickly and in small doses—fifteen minute papers. For this we perhaps should be criticised.

Desire for knowledge is no greater today than in the past, although it sometimes seems to be, because of the rate of speed at which everyone and everything is moving. For centuries men have been seeking more light and truth about the causes and treatment of diseases and this is so of the diseases affecting the periodontal tissues as well as others.

Hartzell, in a recent article, (September, 1920, SUMMARY), tells us that in an article written by Pierre Fauchard and published in 1746, he describes a species of scurvy, which is a splendid description of what we commonly call pyorrhea or more properly should call periodontoclasia. He suggested as treatment, first keeping the mouth clean. Vigorous rubbing of the gums with finger dipped in an astringent and a mouth wash consisting of water and wine. Oh, those happy days more than two hundred and fifty years ago! What a joy some might consider it to have scurvy these dry days.

In Talbot's valuable contributions on the subject of interstitial gingivitis and pyorrhea he deplores the fact that we do not give enough attention to the etiological and pathological factors and says the profession is drifting toward a mechanical trade rather than into a scientific profession. This may be true in part, but surely the present and the future dentist is going to be better equipped with scientific knowledge than those of the past. I cannot agree with Talbot that we have not made any progress in the past eighty years. Specialization in dentistry as well as in medicine seems to be the "big idea" and is a fine one if developed with a broad knowledge of all the subjects allied with the specialty, and with an appreciation of all the problems of the general practitioner. In these days of specialists we are quite apt to leave too much to "George," and forget that it is necessary for the general practitioner to have a thorough knowledge, both scientific and practical, in order to recognize conditions which indicate the services of the specialist. It has been the practice of too many of us to fail in the recognition of incipient conditions, which if properly treated, would not only conserve the teeth and periodontium, but would give the periodontists fewer of the more impossible cases to treat.

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*Read before the Ohio State Dental Society, December, 1920.

In the past, many investigators, real scientists, pseudo scientists and just writers, have given us numerous articles under the titles of Scurvy, Riggs' Disease, Pyorrhea-Alveolaris, Interstitial Gingivitis, Alveolitis and numerous other terms applied to diseases affecting the periodontium, few of which have been generally accepted, although pyorrhea is probably the term in most general use.

The American Academy of Periodontology at its Boston meeting in August, passed and accepted a terminology or a nomenclature. Periodontoclasia—any disease process, which results in the diminution or destruction of the supporting and investing structure of the teeth. The following are some of the accepted terms and definitions:

Marginal Gingiva—That portion of the investing tissue which lies in contact with the enamel, but which is not attached directly to the tooth surface.

Cemental Gingiva—That portion of the investing tissue which is attached to the cementum, but which lies crownward of the alveolar process.

Alveolar Gingiva—That portion of the investing tissue which overlies the alveolar process, and which is so firmly attached to its surface as to have but slight mobility.

Areolar Gingiva—The tissue overlying the alveolar process, and which is bound to it by a loose areolar connective tissue.

Gingival Crevice—The fissure normally existing between the cervical enamel (surface) and the overlying unattached gingiva. Synonym for sub-gingival space.

Gingivitis—Inflammation of the gingival tissue.

Alveoloclasia—An absorption of the tissues of the alveolar process, which does not necessarily involve a corresponding destruction of the pericementum.

Pericementoclasia—Disintegration of the pericementum which may be associated with alveoloclasia without corresponding loss of overlying gingival tissue.

Periodontal Abscess—An infection of the periodontal tissues whose inflammatory exudate drains elsewhere than through the gingival crevice. It is divided into periapical (of pulpal origin), and parietal, (of extra-pupal origin).

Parietal Abscess—A periodontal abscess originating in the peridontal tissue at some point other than a pulpal foramen.

Pericemental Abscess—A parietal abscess located in pericemental tissue which has suffered no previous loss of continuity and which is not an extension of a periclasial pocket.

Gingival Abscess—A parietal abscess located in the cemental gingiva or in gingival tissue overlying a periclasial pocket.

Centric Occlusion—The relation of the inclined planes of the teeth when the jaws are closed in the position of rest.

Eccentric Occlusion—The relation of the inclined planes of the teeth when the jaws are closed in any of the excursive movements of the mandible.

The most of the credit for this new nomenclature should go to Doctor J. Oppie McCall, of Buffalo, chairman of the committee, and I wish to show slides of most complete and comprehensive charts which point out the etiological factors and symptomatology of periodontoclasia and call to our attention the many factors we must consider in the diagnosis and treatment of periodontal diseases.

If we know the etiology and are able to recognize the symptoms, we are then ready to make a diagnosis and outline the treatment. As diagnostic aids I wish to call attention to thoroughness in making your oral, physical, radiographic, pathological examinations and the use of study casts. This particularly for the study of the occlusion as well as for the study of other abnormalities.

In dentistry we find ourselves at one time swinging to the radical point and then back again to the conservative and in either case we often swing to the point of losing our better judgment. This we must guard against.

Doctor Harold Box, of Toronto, one of our foremost pathologists and histologists, tells us that a pulpless tooth is not necessarily a dead tooth, and in his research work shows histological cut specimens of the apical third of the roots and investing tissue, and has proven conclusively that even where a pulp is non-vital, nutrient nerve fibres and blood vessels from the pericementum may continue to nourish the tooth, while the radical operators are sacrificing all non-vital teeth, claiming them to be hopeless and menacing to health.

Do not misunderstand me, for I want to emphasize that we cannot disregard the relation of focal infection to systemic disease; however, more intelligent radiographic interpretation may help us in our diagnosis and prognosis.

Hartzell makes a statement that pyorrhea could not exist except for bacterial growth on the teeth, and that we could not have a pyorrhea or a gingivitis of a continued presence without bacterial growth on and around the teeth, thus claiming that bacterial invasion is the great factor. He adds as other factors malocclusion creating congestion which make easy the invasion of the softer tissues by bacteria, and diet as ranking about equal in importance with malocclusion. He suggests that we must teach our patients that bacterial filth or mould must be kept away from the mouth and teeth and as instructions gives the following: Maintain a clean mouth; learn to remove bacterial growth;

teach the patient the importance of it; explain the method with toothbrush in place in the mouth; place and hold it there yourself; use the brush in the patient's mouth yourself; keep at it until you know the patient can use it properly.

Stillman has laid greatest stress on traumatic occlusion as a principal causative factor. His conclusions are that health depends on normal function. Deformity either of teeth themselves or of the relation of teeth in the arches interferes with function, traumatic occlusion being the sequel of dental incoordination.

Habits of living and diet seem to me to have a very great influence in maintaining better mouth health, and I wish to refer to the most comprehensive and valuable work of Doctor Wallace Seccombe, of Toronto, on "Diet In Relation To Mouth Hygiene," Published in *The Journal of National Dental Association*, June, 1921.

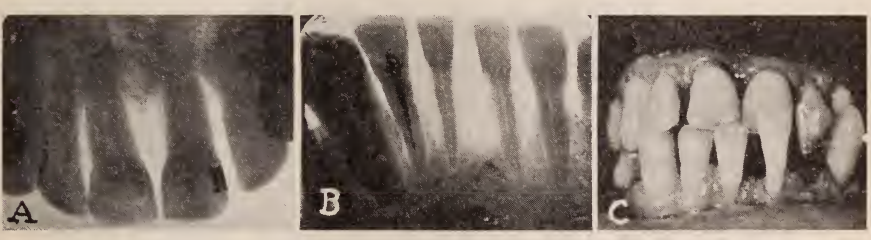

Fig. 1

Many perhaps would have considered the two cases illustrated as hopeless, but both have responded to treatment. *Fig.1*,a, b and c, shows the extent to which supporting structures have been destroyed, though many such cases can be treated, pus flow stopped, and destruction of supporting structures arrested in spite of the malocclusion, which in case illustrated, it would be impracticable to entirely correct.

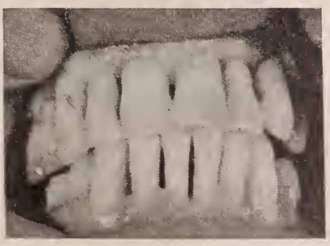

Fig. 2

Fig. 2 shows a great amount of destruction of supporting structure, though yielding to treatment, which included the correction of a decided traumatic occlusion.

Now, one could go on indefinitely reporting cases and quoting the pet ideas of many men, but to follow any one idea without giving serious consideration to all, we might fail in our results.

Our greatest and most valuable service is that of prevention—this lies within the power of every dentist. All of the factors mentioned suggest a more thorough knowledge of the terminology, symptomatology, etiology, pathology, and use of best methods of treatment which include careful instrumentation, prophylaxis by the dentist, advice to the patient about daily personal care and instructions as to systematic, regular habits of living with special advice as to their diet. In short, becoming dental physicians.

If we will coordinate all of these factors and accept our responsibilities as we should, our compensation and reward will be more than merely a financial one.

I believe that a more thorough appreciation and knowledge of the periodontal tissues is fundamentally one of the most important needs of the dental profession today. and in conclusion I wish to offer this little verse:

''If we can do just one thing well
And in that most high place would dwell
Just honest work, I'm here to tell
May save our souls from going to ——
Oh well, you know."

1004 Neave Building.

A PLAN FOR THE ETHICAL DENTAL EDUCATION OF THE PUBLIC*

BY W. LINFORD SMITH

ONE OF THE INNUMERABLE QUOTATIONS which could be made to demonstrate the interest of the profession in the ethical dental education of the public is the statement made by Dr. A. E. Webster, Dean of the Royal College of Dental Surgery of Toronto.

In a paper read at Washington, April of 1920, he said: ''Every dental society and every dental organization since its inception has recognized the need of public dental education, and has appointed committee after committee these fifty years to prepare articles for the press and for general distribution, with the result that now and then something is done, but without any continuous or persistent policy being followed. Sporadic advertising is useless and so is sporadic dental education of the public."

That Dr. Webster is absolutely correct as to the attitude of organized dentistry on this subject is proven by the interest which has been taken by members of the profession in the distribution of the syndicated ''Your Teeth" articles which, at present, are appearing weekly in no less than 373 newspapers throughout the United States and Canada.

These articles are written by Dr. Rea Proctor McGee, and through the pages of the magazine which he edits, the service is offered without charge to any newspaper willing to carry the matter, provided the request is made by a local organization of dentists.

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*Read by Dr. Rea Procter McGee in the Section Oral Hygiene and Preventive Dentistry, National Dental Association, August, 1921.

Readers of the magazine are doubtless familiar with the character of the articles and the plan of distribution.

The 373 newspapers in which these articles appear are read by 3,817,860 people.

If the layman is benefited by reading in the pages of his newspaper authoritative information on the subject of dentistry, it is perfectly obvious that he would derive very much greater benefits if means could be devised for supplementing the newspaper campaign by a series of cards containing similar matter, mailed to his home address.

Such a direct appeal would be the ideal way of accomplishing the desired result, but the cost involved would be impossible to finance by any ordinary means.

The object of this paper therefore is to submit for your consideration a plan whereby direct dental education of the public may be accomplished in an ethical manner and at the same time have the burden of cost so widely distributed that it will not be felt by any individual.

To this end it is proposed to print on postal cards, a series of twelve messages of approximately 150 words each, and to arrange for their widest possible distribution through the cooperation of the individual dentist in his local community.

To safeguard the interests of the profession it is desired that a Committee or Board of Censors be appointed by the National Dental Association or its Oral Hygiene Section, and that permission be granted to print on each card the fact that the subject matter is endorsed or approved by some such eminent authority.

A series of twelve articles already has been prepared, and if the cooperation we seek is granted, they will be submitted to the proper authority for approval.

Should the text of the cards not meet with approval, or should any exception be taken to words or phrases employed, the reading matter will either be rewritten in its entirety, or modified in any way that may be suggested. The cards will bear no form of advertising matter of any sort or description.

The organization and facilities for distribution possessed by the American Dental Trade Association will then be put in operation for securing from the individual dentist lists of persons who, in his opinion, will be benefited by reading strictly ethical information as to what dentistry stands for.

The suggestion will be offered that these lists should be compiled from local organizations—civic, fraternal, religious, political, educational, etc., or in smaller communities, the cards could be mailed to the home address of each individual taxpayer.

When the lists will have been received, the names they contain will be transferred to stencils, and machinery will be installed at a central bureau, where a sufficient clerical force will be maintained to keep the lists alive and to handle the addressing and mailing of the cards.

To assist in covering the cost of the campaign, the service will be offered to individual dentists at $18.00 per annum, for the entire series or twelve, (which is $1.50 per month), for each 100 cards.

Twelve dollars of this amount will be required for postage alone, and it is hoped that the balance will defray the cost of printing, addressing, mailing the cards, etc. Whatever deficit results, those whom I represent will pay the bill.

No person, firm or group of men either hope or expect to derive any profit from the proposition. No salaries will be paid to those in authority, and no expense will be involved, aside from the actual cost of maintaining the service and details incident to putting the plan in operation.

If the cooperation of the National Dental Association is granted, an intensive eight weeks' drive will be inaugurated on the first of October of this year, which I venture the prediction will result in the distribution of a minimum of a million cards per month beginning January 1st.

This will mean delivery to the homes of at least that many American citizens, the message of dentistry and what it stands for.

And one million circulation of this character would not mean circulation in the sense used by publishers; it would mean a minimum of one million, and a maximum of five million actual readers which, it is safe to say are half again as many people as there are today in North America who really recognize in dentistry a vital factor of physical welfare.

In submitting this plan for your consideration, I am dealing with a definite and a concrete proposition.

The facts and figures quoted are in no sense merely tentative estimates as to what can be done.

Organized dentistry for years has sought a means of educating the public, but has been deterred by the enormous expense involved.

There is no question as to the desire of organized dentistry that the public should be educated on this vital topic.

So then, when it is proposed that this be accomplished, and that the National Dental Association cooperate and yet be relieved of the enormous amount of work involved in making the plan effective, it is hoped that the proposal will receive favorable consideration at your hands.

It is impossible in the brief space of time allotted to discuss details regarding the means which have already been devised for such a stupendous undertaking.

But every detail of this proposal has been worked out with the usmost care and every angle will be discussed frankly with any committee which may be appointed to cooperate with us.

The plan is feasible and workable, and its possibilities have been under rather than overestimated.

The subject of this paper is "A Plan for the Ethical Dental Education of the Public."

The two questions respectfully submitted for your consideration are:

First, does the National Dental Association desire that the public be educated?

Second, if so, is the National Dental Association under proper safeguards, willing to approve a plan which is rendered practical by utilizing the organization and the facilities of those whom I represent?

SYSTEMIC CONDITIONS AFFECTING THE FILLING OF ROOT CANALS*

BY DR. P. A. GOULD, GIBSONBURG, OHIO

THAT THE SYSTEMIC CONDITION of a patient has everything to do with the success of surgery is a well known fact, and dental operations are no different in this regard. The dentist should be well informed concerning the condition of the patient before performing oral surgery. There is no surgery that is more likely to produce foci of infection than the filling of root canals. Infection from devitalized teeth and its effect on the patient in lowering immunity by filling the blood stream with bacilli, which when carried to remote parts of the body, find new fields to develop and multiply, makes this field of surgery a serious problem. Some extremists would have us extract where such an operation as the filling of a root canal is indicated. To meet this class with any kind of an argument is not my intention at this time. It is to be taken for granted that there are some subjects where the pathological condition forbids the filling of root canals.

Foreign substances may be tolerated and carried in the physical body for years and not cause any serious effect. Many a soldier has carried a bullet for years without causing him any trouble. At a meeting of the Chicago Dental Society in 1913, an exhibit of physiological specimens of ivory showed, in one case, where the large bullet used in shooting elephants had struck a tusk, shattering it so as to produce many small pieces, and had entered far enough to find lodgment in that sensitive part that corresponds to the pulp of a tooth. I will not attempt to discuss or explain the way that nature cared for this injury without the aid of a dentist. When the ivory was taken from the elephant some years later, the bullet was found imbedded in ivory formed around it in much the same way that a grain of sand is covered in the oyster, forming the pearl. The shattered pieces of the tusk were knit together in the same way as the pieces of a fractured bone will heal and grow together. This physiological reconstruction was verified with several other specimens.

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*Read before the North Central Ohio Dental Society.

At many of our state and local society meetings we have heard papers read and lectures given on the treatment and filling of root canals. The fact that gutta-percha points and other materials used in the filling of root canals could be forced through the foramen of the root without causing any trouble, was made one of the principal topics for discussion. The use of some materials have been especially recommended for this purpose in cases where the pericementum has been destroyed, leaving a small opening in the alveolus caused by the abscess.

What are the forces that make reconstruction in these conditions possible?

Do they always respond in every subject?

If not why do they not?

How do we know when we have a subject that will or will not take care of the bullets that we shoot into him?

To answer these questions would take more than my allotted space. We have asked them and will let each one answer the question himself, if he has such matters before him to work out; but will deduce here a few things that my experience prompts me as expedient in an introduction to some things to think about and study.

There are a few things to which we must call attention relative to the condition of every patient. All things proceed from a first cause or that which is prior. The cause for what nature did for the elephant's tusk, or the power that nature had to make this reconstruction possible, was in the fact that the subject was in harmony with all that went to make it perfect and normal in the order in which it was created.

Comparing a man with an animal is not done with any intention of making him imitate one; he does that too often, and becomes worse than an animal in so doing, because he is not acting in a way that is perfectly normal for him to act. The laws of order that are to govern him are different to those that govern the animal kingdom. He is associated with two laws of order, and he does not violate one or the other of them without violating both. The Natural laws of order and the Divine laws of order of his physical nature and spiritual life are always affected in so doing to a greater or less extent, and the effect is going to show itself the most in the physical while he is in the natural world.

The care of the physical should receive its share of attention as well as the intellectual; and this becomes the personal responsibility of every individual. When that nature, that is common to all animals, of depending upon themselves is not cultivated and practiced, we have those that care for nothing except to see what they can get others to do for them, or give them. They are always to be found wanting or absent when it comes to their giving or doing anything that will be of any public or personal benefit to any one but themselves. This is the greatest evil that we have. If we neglect this natural instinct it leads to a degenerate race. This class is always to be found wanting when they are placed in a position where anything is to be done, upon which depends the good of the public health, or anything else that requires any exertion on their part, if there is any way they can get the credit for it and not do it. We have seen many that will dress and put on an immaculate appearance, and neglect many things that are necessary for the good of their bodies. This class of people are not responsible, and their resistance is generally weak, and whatever you do for them, look out for trouble.

In some we find the intellect neglected and the subject governed by the physical instincts which you will find well developed. Again the intellect is developed at the expense of the physical, so much so that at times it is destroyed. We should be men and women; not over-developed animals, nor should we be encyclopedias without physical powers to make what we know of use to those about us, and to be a part of the commonwealth. Work like that of our Oral Hygiene Society is not without its rewards. It is the beginning of many good things that the medical profession is also doing in the same direction.

There are several causes that operate in the repairing of tissue, and forming of new tissues. The manner in which the cause flows in to accomplish its effects in the animal kingdom is a subject of the profoundest inquiry. It is a mystery of nature that never can be revealed without a right understanding of the subordination of things, nor can this subordination itself be understood without practical knowledge of the anatomical construction of the brain and the body, where nature dwells.

Internal causes are in a superior degree and are not easily understood, but are always to be seen in the effects that they produce. We must not look at the effects and think of them as causes. Externals are easily seen and understood and therefore easily controlled; but for the internal we depend upon the temperament and conduct of the subject, which, in some cases is tempered by the environment that it has to exist in. You may be familiar with the latter, and the environment is apt to be studied as the cause, when it furnishes only a medium for the cause or the internal influences to work in. The internal influences if they are normal and in order, will have an orderly effect upon disorderly environments, but if these influences are weak and below normal, the reverse is always to be noticed, and there is always the appearance that the externals were the cause, which is an illusion that is often taken for the truth.

For example, some will recommend the extraction of all aching teeth, rather than the treatment for filling, because some patients have been benefited by so doing, in cases of gastritis, nephritis, rheumatism, or some other trouble that has been influenced by the oral infection. To extract all teeth where the nerve is affected by decay or injury and the root must be filled to save the tooth, because some or many teeth so filled have become abscessed and the systemic infection has had a serious effect, is about as poor surgery as it would be to attempt to fill all aching teeth.

Your writer fills many teeth where the root canal has to be filled at the risk of the patient. In fact, every tooth where there is any reason to believe that there is or has been any abscess or trauma that has destroyed the attachment of the pericementum in the socket of the alveolus, must be filled at the patient's risk. We might say here that no root canal should be filled or closed permanently until such foci of infection are healed, which may be done at times, with treatments that are varied as the condition of the tooth and the patient may require.

Caries and necrosis associated with a plethoric subject, especially if there be any evidence of suppuration or gangrene present, should indicate that such patients are not to be considered fit subjects for root-canal fillings under any circumstances, until something is done to better the condition of the blood stream. To do this, the extracting of abscessed teeth would in all probability be necessary.

An excess of glycogen secreted into the circulation of a subject who does not have the necessary muscular activity to absorb it, or work the surplus, will develop kidney diseases, gout, rheumatism, and other troubles for which abscessed teeth are blamed as being the cause. It would not be advisable to attempt any very extensive dental operations with any of these pathological conditions present, that would in any way contribute to, or produce foci of infection. Any systemic condition that is affected in any way by abscessed teeth, always provides a condition that is likely to develop an abscess when the slightest irritation is given.

Frequently the finding of a cause of a systemic disorder only shows that the cause discovered is associated with or influenced by another abnormal condition, as it may be associated with the glycogen, the bad effects of which were made possible by there being an insufficient amount of the secretion of the thyroid gland, the thyroidin, but this is not always to be found to be the first cause, or that which is prior. That which is prior in nature and can be associated with it, and has an influence at all times on the functioning of all the organs of the body, is that substance secreted by the brain and nerve centers called by our early writers, "the animal spirit," or soul, and by writers of today as the Nissl Substance.

When there is not enough activity and constructive energy associated with the brain to produce the normal flow of this secretion required to cause the natural functioning of the physical body, you always will find the physical below normal; and although the mental faculty may be active and well developed, you have not in all respects a perfect subject; the conditions of old age, if nothing more, will present themselves. The limits of these causes and effects will not be pursued any further at this time; we will refer them to the educational department of our Oral Hygene Committee.

Every animal has this substance referred to as the "animal spirit;" but in man we have another spirit that is not of the material world, and its substance is not to be seen with eyes that were made to see material matter, or is it possible to discover it by any of the natural or material sciences. We will leave it to each one to analyze his own state or spiritual quality for the present; but let us say this much: whatever is its state or quality at all times it carries with it a powerful influence for good or bad upon the physical functions, that are not possessed by any animal nature except that possessed by man. We will find abnormal conditions of the mind that will not respond to the instincts of the physical, where these instincts have lost their influence, and have become practically dead.

The functions of organs that are influenced or abnormally affected by some custom or bad practice, will not always develop infections in the organ affected; but when any organ does not function properly the resistance of the subject is lowered, and the possibility of an infection in any part of the body is greatly increased. This will be absorbed in a manner that is least expected. Hence the danger that confronts the surgeon is also with the dentist, and it is up to him to see that he avoids sepsis in any way that he does his work, and more especially the filling of root canals that may cause a focus for infection. Much is left by the patient to the judgment of the operator, for cases that require the filling of the roots of the teeth, to be able to know if there are conditions present that cause susceptibility to infection to a greater or less degree, and that his work is done in a way that a focus of infection is not produced.

All operations that will aid the subject in the powers of mastication will not only benefit the physical body by the removal of foci of infection in the oral cavity, but more especially the teeth that remain in the mouth are improved by their function being restored; and if the patient makes good use of them, the powers of resistance is greatly increased, and the good effects are always noticed and appreciated by the patient.

Your attention is also called to the close relation that exists between the pituitary membrane and its condition. Anything that irritates it is apt to produce conditions that increase the danger of abscesses. Also the influence of the suprarenal capsules; an aggravated flow of the secretions from them will make the dentist and patient no small amount of trouble if it is not accounted for and controlled. The last two subjects were presented to you at the October meeting for 1914. It was published in the November number of THE DENTAL SUMMARY for 1915.

FUNDAMENTALS OF OPERATIVE DENTISTRY

BY W. H. O. McGEHEE, M. D., D. D. S., CLEVELAND, OHIO

LATE PROFESSOR OF OPERATIVE DENTISTRY, DENTAL PATHOLOGY AND THERAPEUTICS, AND SUPERINTENDENT OF CLINICS IN THE DENTAL SCHOOL OF WESTERN RESERVE UNIVERSITY.

DISEASES OF THE PERIDENTAL MEMBRANE

ORAL FOCI OF INFECTION—DIAGNOSIS AND PROGNOSIS OF CHRONIC PERIETHICAL DISTURBANCES—CHRONIC SEPTIC APICAL DISEASES—DENTAL GRANULOMA—PERICEMENTAL ABSCESS.

FOCAL INFECTIONS OF DENTAL ORIGIN

ATTENTION has been called repeatedly in this work to the close anatomic, physiologic and pathologic relationships existing between the teeth and supporting structures and all other parts of the body. Infection surrounding the root of the tooth may, and frequently does, extend by way of the vascular and lymphatic systems, as well as by continuity of tissue, to closely associated or far distant parts. As a result, many very grave systemic disorders, either of a vague or definitely manifested nature, are produced.

Certain micro-organisms, located in a root canal or in the periapical tissues, may be of a harmless nature under the conditions in which they are placed. However, according to Hartzell and Rosenau, if they succeed in entering the blood and lymph streams, and are transmitted to other tissues, they may, in their new environment, change their form and characteristics (transmutation) and be productive of great harm. A streptococcus from the tonsil or an alveolar abscess, may, under suitable cultural conditions, change to a pneumococcus, and, if it reach the lung, be productive of pneumonia; or if it reach some joint of the body, may cause arthritis deformans (rheumatism); or, in other cases, the same micro-organism may locate in the valves of the heart, be transformed under its new environment into the streptococcus viridans and result in a heart lesion; under other conditions it may travel to the inner coat of the stomach and produce an ulcer of that organ. Under similar conditions, bacilli may be changed to spirilla, and other forms of germ may take unto themselves entirely different shapes and activities. Harmless bacteria are thus seen to be frequently capable of producing great harm under changed environment, and the opposite result may also occur, viz., harmful species may lose their virulence under different cultural conditions. In septic diseases occurring in the apical space, pus-forming micro-organisms usually are present, which, traveling to distant parts, may, under the changed conditions in which they are placed, either lose their virulence or be stimulated to increased activities. The normal resistive power of the tissues involved, in addition to other factors concerned, undoubtedly will have a definite influence on the result produced.

According to Clarence J. Grieves, the following disturbances may result from focal infections located in or about the teeth:

First, affections of the muscles (myositis).

Second, affections of the joints (arthritis and synovitis).

Third, affections of the blood (septic anæmia, endocarditis, and pleurisy).

Fourth, affections of the glands (lymphadenitis).

Fifth, affections of the nerves (toxic neuritis and degenerations).

Sixth, affections of the excretory organs (skin rashes and nephritis).

Seventh, affections of the intestinal tract (septic gastritis, enteritis, cholitis, cholecystitis and appendicitis).

In many instances systemic infections of this nature are easily recognized, diagnosed by the physician and traced to infections about the teeth as causative agents, but perhaps just as frequently the constitutional disturbance is of a very vague nature without markedly definite manifestations. Some of the vague symptoms observable in these cases are: anæmia, palid or pasty complexion, general malaise, loss of appetite, debility, night sweats, loss of weight, low fever, (100 deg. Fahrenheit), or sub-normal temperature. Many cases of this kind have been cured by the removal of infections in the mouth, either through thorough sterilization and filling of root canals, treatment of chronic alveolar abscesses, extraction of the affected teeth, removal of the tonsils, eradication of pyorrhea pockets, treatment of antral disease, abandonment of faultily-constructed crowns and bridges and other sources of infection.

It is then highly important for the dentist to realize fully the great significance of the bearing which his root-canal operations may have on the health and even life of his patient. It is, however, equally important for him to recognize the fact that the above-mentioned disturbances may, in many instances, have no connection whatever with oral conditions, but may be due to entirely different causes, viz., the focus of infection producing the disturbance may be situated in an entirely different part of the body. The significance of conditions of this nature was not fully appreciated by either the medical or the dental profession until recently. A full realization of their import often has resulted in the adoption of extremely radical measures for their relief by many men in both professions, with the result that thousands of teeth have been needlessly and ruthlessly sacrificed during the past few years through the extraction operation. The radical element in the medical profession has been especially guilty in this regard, referring patients to the exodontist whenever they were unable to discover other causes for systemic disturbances, and not realizing or recognizing the full importance of the necessity for the retention of the teeth for preservation of the continuity of the arch. A similar class of dental practitioners, prone to enthusiastically subscribe to new fads, has been equally guilty, with the result that great harm has been done. However, it would seem that a normal, sane attitude is about to be reached by both professions in regard to questions of this nature.

The solution of the problem lies in the establishment of closer affiliations between the two professions, and a closer study, on the part of both, of the diagnostic, pathologic and clinical relationships of these disturbances. An imperfectly filled pulpless tooth or a partially-healed infection at the apex of a tooth always is likely to be transformed suddenly into an active source of systemic infection, if the resistive powers of the body be low, from any cause, and especially so if the normal resistance be temporarily or permanently lowered from some systemic disturbance arising after the dental operation has been performed. Operations of this nature, even if they are believed to be well nigh perfect, as revealed by the X-ray, suddenly may give trouble and become active sources of infection in constitutional disturbances, lowering the resistance of the tissue cells of the patient, since, as is well known, a single micro-organism left in position and suddenly springing into activity, may multiply at a rapid rate and transform the apparently successful operation into a local focus of infection which may become a menace. Great caution should be exercised in determining whether teeth from which pulps are to be or have been removed, or which are affected with disturbances of the periapical tissues, should be retained in the arch or extracted. The promiscuous extraction of teeth of this type is unscientific and should be discontinued. The decision as to whether a tooth should be retained or extracted should be determined by the skill and ability of the operator to cope with the technical difficulties involved, the importance of the tooth as a part of the masticating machine, as a means of retention for artificial substitutes, the probabilities of a successful outcome as far as thorough sterilization and filling of the canals and treatment of the apical complications is concerned, and also on the systemic condition of the patient.

DIAGNOSIS AND PROGNOSIS

The use of the X-ray is the most valuable diagnostic measure in these cases, and it should be resorted to for this purpose at the beginning of all cases where root-canal work is to be attempted. Anterior teeth with straight, well-developed roots, offer the best prognosis, the bicuspids next, while molars, owing to the technical difficulties involved, afford the poorest chances of a successful outcome. Pyorrhetic teeth, affected with apical complications, are usually poor risks, and in many instances had better be extracted at once. Types of cases usually unfavorable for treatment are those in which there is too much dead apical cementum, resulting from extensive chronic alveolar abscess, those on which there is a large amount of dead alveolar cementum as exhibited in pyorrhea cases, and teeth with abscesses opening into the antrum. (*Fig. 285*). In cases of this nature, the pericementum is often extensively destroyed, the cementum encrusted with calculus, necrotic, and pus-soaked, and in a condition which it is impossible to restore to the normal state.

In the latter types, extraction usually is advisable. In the milder forms of chronic apical infection, and even in some of the cases of more extensive granuloma, the operation of excision of the root end, to be described later, may be performed and the tooth restored to prolonged periods of usefulness. (*Fig. 286*).

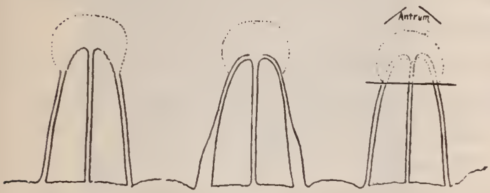

Fig. 285

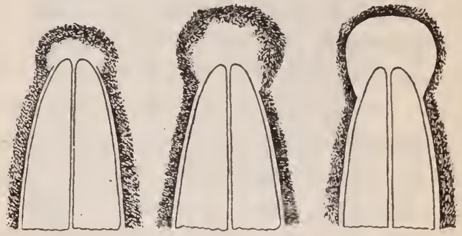

Fig. 286

Fig. 285—Types of abscess unfavorable for treatment. The tooth on the left represents a case with too much dead apical cementum. The root in the center is badly affected with pyorrhea. On the case to the right the infection has opened in the antrum.

Fig. 286—Three distinct types of periapical disease. The case to the left represents a small or primary granuloma, usually seen in the radiograph as a small circumscribed radiolucent area. This type is frequently amenable to treatment. The case in the center represents an advanced granuloma, no definite sac apparent. Seen in the X-ray film as a large, diffuse radiolucent area. This type is less responsive to treatment. The case to the right, shows in the film as a large circumscribed radiopaque area, definitely cutlined. This type usually presents a definite wall, with sac formation. If treated, excision of the root and eradication of the sac is required.

In reading the radiograph, which should be made in every instance, teeth known to be normal should be studied first, with the assistance of a reading glass or dentiscope. On a normal tooth, the peridental membrane may be seen as a continuous radiolucent line encircling the root. Surrounding this will be noted the lamina dura, exhibited in the form of a radiopaque line. The trabecula of bone at the apex and outside of this line should appear homogeneous with the surrounding bone.

In some instances the apical space surrounding teeth recently infected or infected with micro-organisms of low virulence may appear perfectly healthy in the X-ray film, while teeth suffering from the effects of traumatic occlusion, or chronic inflammatory disturbances of the apical tissues may exhibit an apparent rarefying process in the surrounding bone, simulating infection. Consequently, it should be remembered that the appearance of a radiolucent area at the apex does not always signify the presence of infection. Many errors in diagnosis are thus made from an imperfect understanding of this fact. The radiograph is, then, not an infallible guide in the diagnosis of infective conditions of the periapical tissues.

When it is decided to attempt the preservation of teeth affected with septic conditions at the root end, the responsibility should be assumed alike by patient and operator, and the possibilities of future complications fully explained. The case should be X-rayed at the termination of the operation, again at intervals of one, three, six, and twelve months, and again at occasional periods. A successful termination will be indicated by progressive filling-in of the affected area with new bone formations, which should be complete and homogeneous after periods ranging from one to two years. In case these procedures cannot be followed, it may be deemed the part of wisdom to extract, rather than assume the risk of subsequent complications.

As a rule, teeth affected with granuloma had better be extracted if present in the mouths of patients suffering from arthritis, heart, kidney, or splenic affections, or some other form of grave disturbance for which definite causes cannot be found. Patients of the above type are peculiarly susceptible to infections, and the dentist is not justified in subjecting them to additional possible sources of infection. The co-operation of the physician and laboratory technician should be secured in making a decision in cases of this nature. Great significance should be attached to the urinary analysis, the blood picture and blood pressure indications. The majority of patients suffering from streptococcal infections exhibit low blood pressure, low hemoglobin index and deficiency of red and white blood cells with a lymphocytosis. The minority vary from normal to very high blood pressure with an exhibition of leucocytosis. With a little training, the dentist should be able to estimate, approximately at least, the state of arterial tension of the patient and be guided accordingly. It also should be realized that the danger of a focus of infection frequently depends not so much on the *size* of the granuloma, as revealed by the X-ray, as it does on the *virulency* of the organism producing the disturbance, the tolerance of the tissue cells, and the tension under which the infection is operating.

CHRONIC ALVEOLO-DENTAL ABSCESS

Synonyms. Chronic, septic, purulent, apical pericementitis, dental granuloma, chronic periapical abscess.

556. What are the *Causes* of chronic, septic, purulent, apical pericementitis?

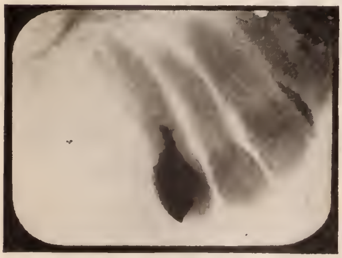

Fig. 287

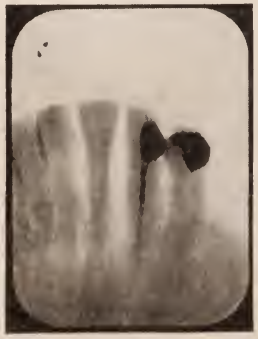

Fig. 288

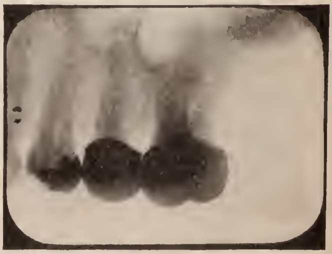

Fig. 289

Fig. 287—Small granuloma on the cuspid. Canal unfilled.
Fig. 288—Granuloma on lower anterior teeth. Teeth badly affected with pyorrhea.
Fig. 289—Small granuloma on the cuspid.

The same causes producing the acute variety. The condition is one in which pus formation is fully established, the tissues of the pulp are largely broken up, and the apical tissue has been de-

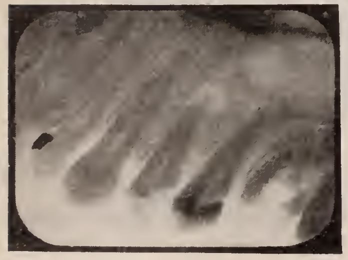

Fig. 290

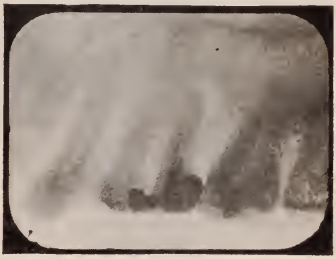

Fig. 291

Fig. 290—Small granuloma on the first bicuspid.
Fig. 291—Large granuloma on the second bicuspid.

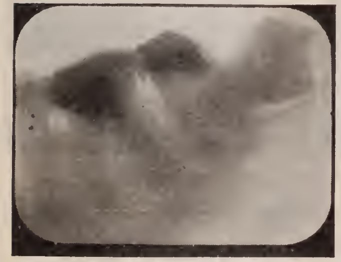

Fig. 292

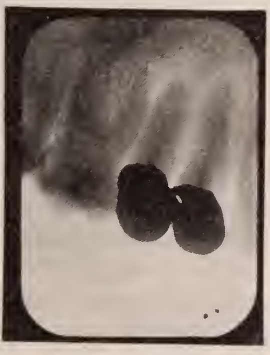

Fig. 293

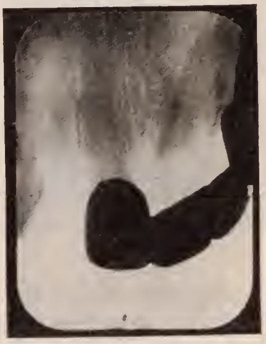

Fig. 294

Fig. 292—Large granuloma on the lower first molar. The third molar is impacted.
Fig. 293—Granuloma affecting bicuspids and mesial roots of first molars.
Fig. 294—Badly-infected central and lateral roots.

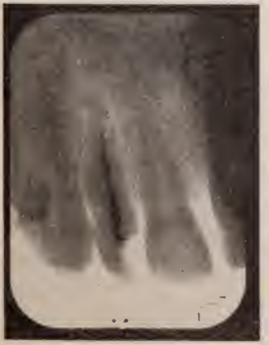

Fig. 295

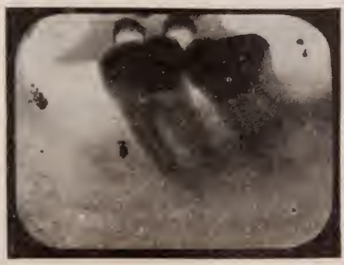

Fig. 296

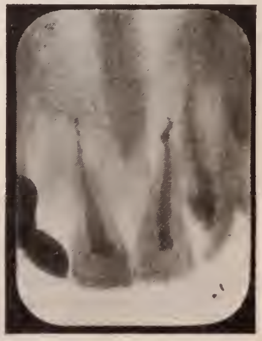

Fig. 297

Fig. 295—Extensive granuloma.
Fig. 296—Extensive granuloma on lower third molar.
Fig. 297—Large granuloma on both upper central incisors.

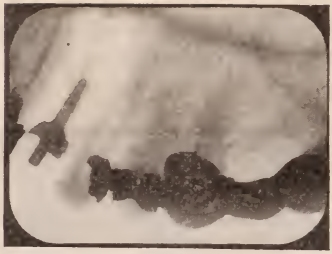

Fig. 298

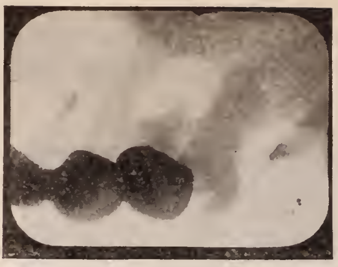

Fig. 299

Fig. 298—Marked case of infection surrounding the root of an upper lateral incisor.

Fig. 299—Pronounced case of pus formation affecting many teeth. One tooth presents badly-absorbed roots.

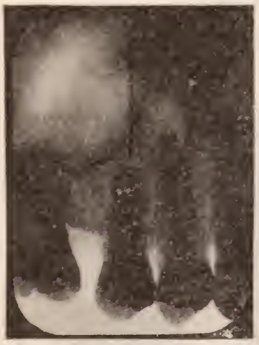

Fig. 300

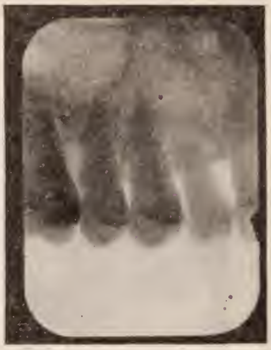

Fig. 301

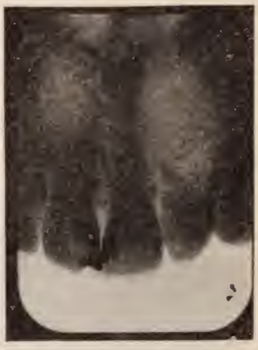

Fig. 302

Fig. 300—Large granuloma on the first bicuspid. Resorption of root of second bicuspid. Protruding gutta-percha points.

Fig. 301—Badly-absorbed roots of a cuspid. Surrounding bone fairly normal.

Fig. 302—Badly-absorbed upper lateral root. Bone appears fairly normal.

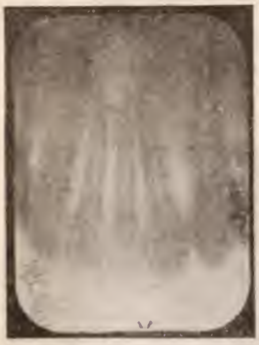

Fig. 303

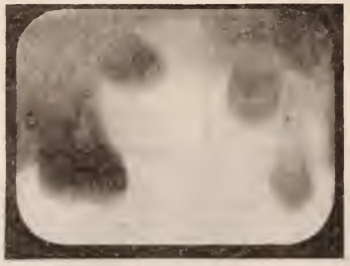

Fig .304

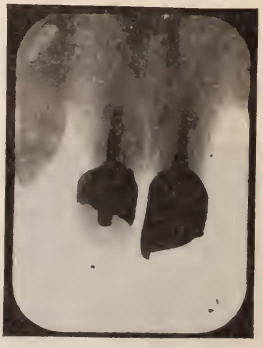

Fig. 305

Fig. 303—Large circumscribed radiopaque area at apices of lower centrals and laterals. Cyst formation.

Fig. 304—Large cyst due to developing permanent teeth.

Fig. 305—Imperfectly-filled canals, likely to lead to abscess formation.

stroyed to a point where an abscess cavity is present in that locality, while the acute symptoms of pain, tenderness and swelling have largely subsided. (*Figs. 287 to 306 inclusive*).

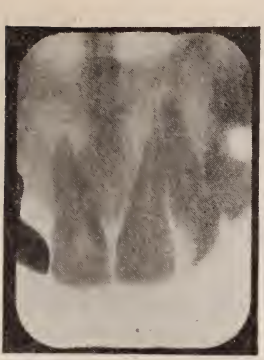

Fig. 306

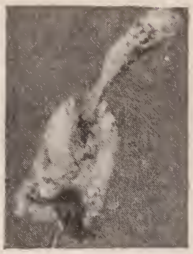

Fig. 307

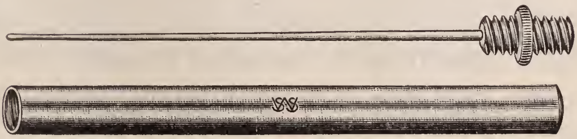

Fig. 308

Fig. 306—Protruding root-canal fillings with apical complications.
Fig. 307—Large abscess sac on a molar.
Fig. 308—Abscess probe and case.

557. Name the *Varieties* of chronic alveolar abscess.

First, abscess without sinus; the pus discharging via the root canal (false blind abscess), or being absorbed via the lymphatics and the blood streams (true blind abscess).

Second, abscess with sinus; the pus having bored its way through the overlying bone and opening externally.

558. What *Dangerous Conditions* are liable to arise from masked cases of chronic abscess without sinus?

Local foci of infection may be established, in which the pus and toxic products are slowly absorbed via the lymphatics and blood streams, producing general depression of the metabolic functions of the system, and resulting in lowered vitality, infections in other parts, loss of vigor, sleeplessness, anorexia, anæmia, leukæmia, intestinal disturbances, rheumatism, arthritis and vague disturbances of internal organs.

559. Describe the *Routine Treatment* for chronic aveolar abscess without fistula.

Open the chamber and canals under aseptic precautions, remove the contents, evacuate the pus by pressure over the apex of the tooth and swabbing of the canals. Dry the chamber and canals and seal in formocresol, modified formocresol or other antiseptics. Repeat the treatment frequently, sometimes daily, until the pus-flow stops; then seal in a mild, antiseptic, anodyne treatment for a week or ten days; then, if the case is healed, as evidenced by stoppage of discharge, disappearance of all odor, tenderness and other symptoms, the canals may be filled. *Over-treatment*, or too frequent treatment, sometimes will result in the prolonged continuance of a serumal discharge, which is not pus. In these cases, dilute the formocresol remedy, or use campho-phenique, phenol compound, Black's 1-2-3, or eucalyptol compound. If, after using one or the other of these remedies, serum continues to exude, dry and fill the canals, and give the case physiological rest for a week or two, before placing the permanent filling in the crown of the tooth.

560. In case the *Routine Treatment Fails*, what measures should then be resorted to?

In very mild and simple cases the *Acid Treatment* may be tried. There are probably complications present, which require additional remedies to stimulate granulation and healing. In these cases, force through the apical foramen, after the method of pressure anesthesia, phenol-sulphonic acid, fifty per cent. sulphuric, or aromatic sulphuric acid, or fifteen per cent. trichloracetic acid, to stimulate granulation. Before doing this, evacuate the pus, and then, after the acid injection, seal in modified formocresol or the other agents previously mentioned. This acid treatment may be repeated at a subsequent visit, if necessary, and frequently will check the condition. If another tooth is involved, that also should be opened and treated. The acid treatment should not be attempted in cases of granuloma with extensive involvement of the root-end and apical tissues.

561. In case the *Acid Treatment Fails* or is not applied, what additional procedures may be adopted?

Establish an artificial sinus and treat as described under abscess with sinus, or perform the operation of apicœctomy.

562. In what *Localities* are fistulæ from chronic abscess liable to open?

Usually over the affected tooth, to the labial or buccal side, sometimes to the lingual side, and occasionally in the antrum, the nasal cavity, on the vault, on the face, or in far distant parts.

563. What methods are valuable for *Diagnosing Sinuses* and the condition of the tissues at the ends of the roots of affected teeth?

The silver probe to follow the sinus to its termination (*Fig. 308*), and the X-ray.

564. Describe two *Methods of Establishing an Artificial Sinus*.

First, Black's method. Immerse the face of a foot-shaped plugger in phenol, and touch to the gum over the apex of the affected tooth. Repeat the procedure and continue in this manner, applying slight pressure until the bone is reached, when a spear drill, dipped in phenol, is quickly run through the alveolar plate to the root apex. Excess of phenol should be avoided or neutralized with alcohol to prevent spreading to adjacent tissues.

Second, the routine method, which is the one largely used at present, consists in the use of a local anesthetic, such as ethyl chlorid, or conductive anesthesia, after which, under aseptic precautions, the gum is lanced to the bone and the periosteum turned up with an excavator, small scaler, chisel or periosteotome. The bone is then drilled through to the apex of the root, following which, after clearing the canals, normal saline solution, peppermint water or cinnamon water is injected from the root canal, with a hypodermic syringe (around the needle of which is packed unvulcanized rubber), through the fistulous opening. This forcible injection still further establishes the fistula, and forces out the contents of the abscess tract, completing free drainage. After free drainage is established, force through from the root canal, by means of unvulcanized rubber, after the

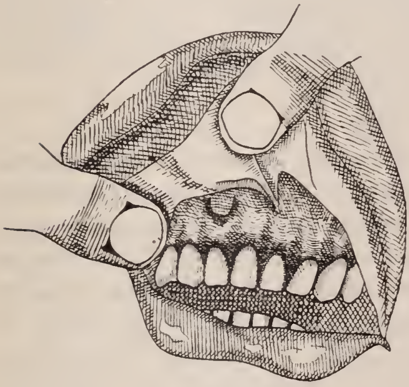

Fig. 309

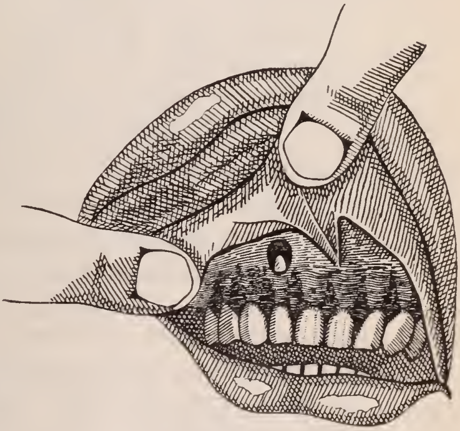

Fig. 310

Fig. 309—Incision for apicœctomy on the right lateral incisor.
Fig. 310—Apicœctomy. The root apex exposed.

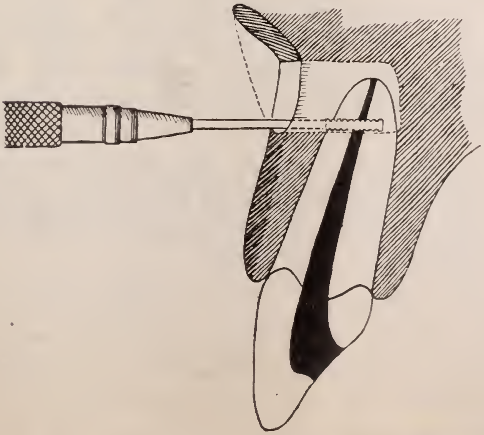

Fig. 311—Apicœctomy. Amputating the root with a fissure bur.

method of pressure anesthesia, phenol, phenol compound, phenol-sulphonic acid, sulphuric or aromatic sulphuric acids, to cauterize the tract.

565. In addition to establishing the sinus, what *Other Treatment* is indicated for *Abscess with Sinus?*

The sealing into the canals of the same medicaments used for abscess without sinus, in addition to the flushing of the sinus through and through, with the bland solutions previously mentioned, and the cauterizing of the tract. These procedures are repeated until healing occurs. *In the majority of cases it will be deemed advisable to extract the affected tooth rather than to attempt procedures of this nature.*

566. In case all the previously-mentioned methods fail, what *Additional Procedures* may be resorted to in the treatment of apical abscess?

Apicœctomy, apexotomy, apectomy, radectomy, or excision of the root end, all of which are synonomous. It is frequently advisable to perform this operation at once, rather than attempt the previously-mentioned procedures.

567. Describe the operation of *Apicœctomy.*

First fill the root canal, after having obtained a radiograph. Then inject a local anesthetic, and, under aseptic precautions, make a linear, or preferably a semi-circular incision of the gum over the apex, cutting to the bone. (*Fig. 309*). Hold the tissues back with a gum retractor, and deflect the periosteum with a periosteotome. Now remove the overlying bone with chisels, or the bone may be drilled through with a surgical bur or drill. After exposing the root end (*Fig. 310*), excise it, or cut it off with a fissure bur (*Fig. 311*), remove the excised portion with an elevator or excavator, and smooth up the end with a round bur. Some operators prefer to excise the root with chisel and mallet, although there is danger of splitting the root. Next curette the area, removing any necrosed bone present, flush out with an antiseptic solution, and, in extensive cases, pack with sterile gauze. The packing should be changed every other day until granulation fills in the opening. In the majority of instances it is better practice to close the gum flap and stitch together with silk. In either case, the patient should keep the mouth clean with an antiseptic wash and the healing process should be observed by occasional subjection to the X-ray.

568. In case apicœctomy fails, what may be tried as a *Last Resort?*

Replantation is still advocated in favorable cases by a few operators. However, it usually is considered inadvisable. Under the latter circumstances, the extraction operation has of necessity to be resorted to.

SOME RECENT METHODS OF TREATING SEPTIC CONDITIONS IN THE ROOT CANALS AND PERIAPICAL TISSUES

Silver Nitrate and Formalin, (Percy R. Howe). Recently a combination of the double salt of ammonium silver and formalin has been advocated by Howe for the treatment of putrescent pulps and chronic alveolar abscesses. The author does not believe that this method should be used as a routine measure in the treatment of cases of this nature, owing to the marked tendency of the silver salt to produce discoloration of tooth structure. If forced through the apical foramen in uncomplicated cases of putrescent pulp, it is also strongly irritating.

The method of application, as advocated by Howe is as follows:

Under aseptic precautions, remove the contents of the pulp chamber and apply the silver nitrate solution (bottle number one), saturating the remaining pulp tissue in the canals. Then, after waiting about three minutes, apply the formalin (solution number two) and allow the mixture to remain in position three minutes, when the canals may be opened and their contents removed. Now apply on a smooth broach, or absorbent point, a drop of solution number one, manipulating the solution carefully with a smooth broach, avoiding forcing through the foramen. Then, after an interval of three minutes, carry in a drop of solution number two, and thoroughly broach out the canals. After an interval of another three minutes, dry the canals thoroughly and apply another drop of the silver ammonium solution (number one), to which is then added a drop of eugenol, and the broaching process continued. After three minutes, dry the canals and fill.

In cases of chronic alveolo-dental abscess, the same method of treatment is applied to the canals and the routine treatment for apical abscess is then instituted. During the abscess treatments, Howe recommends sealing Dakin's solution into the canals during the intervals between the visits of the patient. After healing of the abscess, again make three or four applications of the silver ammonium formalin preparation in the canal, and then fill. If response to the treatment is not effective, the Howe preparation may be forced directly through the root end into the apical tissues. This latter procedure is cautioned against in uncomplicated cases, on account of the irritating effect produced on vital tissues.

Solution of Dichloramin-T. This preparation is being advocated for the sterilization of root canals and infected apical tissues, although it is still in a state of experimentation. Its principal disadvantages seem to be its marked tendency to produce irritation and an excessive flow of lymph. Until additional work is done with it, and its place is more definitely fixed in the treatment of these conditions, the author cannot recommend its use. However, a brief description of the technic of its manipulation is herewith given.

A five per cent. solution of the salt in chlorosane (chlorinated paraffin) is recommended by Herman Prinz. Dichloramine-T solutions deteriorate very rapidly, consequently, only fresh solutions should be used and these should be kept in glass-stoppered, amber colored bottles, which protect them from the light. The solutions should be kept away from heat, light, and contaminating substances of all kinds. To prepare an ounce of the preparation, twenty-five grs. of dichloramin-T are added to one ounce of chlorosane, the mixture thoroughly shaken, and the bottle placed in a pan of very hot water, when, at the end of fifteen minutes, complete solution usually results. A few drops of the preparation should be removed from the container with a glass rod and placed on a glass tray ready for use.

Now, after opening the pulp chamber and canals, and thoroughly drying under aseptic precautions, carry the solution into the canals on an absorbent point. Do not use broaches for this purpose, as metals produce contamination of the liquid. With a pumping motion, thoroughly moisten the canals, and, in case of periapical complications, force the solution through the apical foramen into the infected area. The use of the warm air blast from a chip blower or hot air syringe helps further to diffuse the oily liquid into the finer ramifications of the canal or through the apical foramen. A fresh point carrying the dichloramin-T solution is now sealed in the canal for twenty-four hours, at the end of which time the treatment is repeated and the solution sealed into position for another twenty-four hours. A third application is made in the same manner on the return of the patient and left in position for forty-eight hours, at the end of which time the case is ready for filling, if all evidences of putrefaction have disappeared. Dichloramin-T, owing to the fact that it is an active lymphagogue, usually produces a marked serous discharge, which, it is claimed by the advocates of the method, is an advantage, especially in cases of septic conditions at the root end, on account of the increased tendency to produce efficient drainage.

Ionic Medication, (Ionization). During the past few years ionic medication of septic root canals and of infections of the periapical tissues has come into some prominence. This method of treating conditions of this nature has been advocated recently by M. L. Rhein, Weston A Price, George T. Fette, and Sturridge, of England. At the present time, it may be said that the results obtained are not satisfactory and, unless improvements are made in the technic of application, the method is likely to be entirely abandoned.

The process consists in dissociating the ions of certain salts in solution, by means of a mild electric current, and thus driving them into the tooth structure and apical space. Two prominent forms of appliance for this purpose are the Ritter and the McIntosh ionization equipment. (*Fig. 312*). These appliances consist of current regulators and indicators for controlling, regulating and indicating the strength of the current, a cheek electrode, to be placed on the cheek of the patient, a tooth electrode carrying a metallic point to be inserted into the canal to be treated, current and motor generators and transformers to be used in connection with direct or alternating street currents, and other accessories.

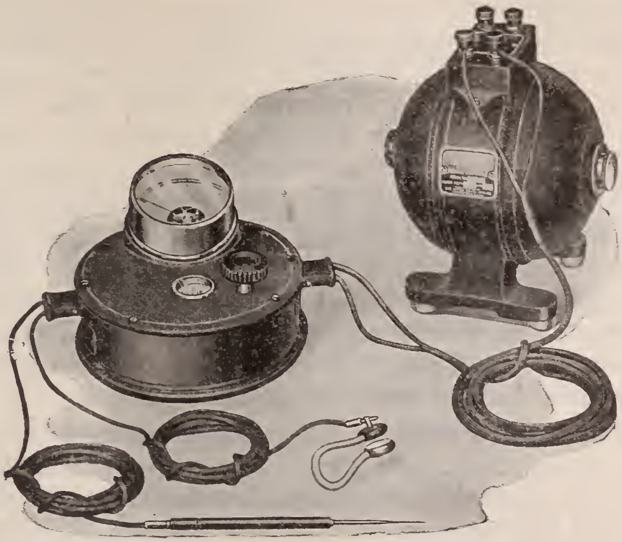

Fig. 312—The Ritter ionization equipment.

The chemical agents recommended for ionic medication by the previously-mentioned authorities are zinc chlorid or sulphid, three per cent. solution; copper sulphate, two per cent. solution; silver nitrate, three per cent. solution; and tincture of iodin and water, equal parts. The canal to be treated is saturated with one or the other of these solutions, the small tooth electrode needle is placed as deeply as possible in the canal, the face electrode is applied to the cheek of the patient, and the current is turned on and slowly increased in amount, thus dissociating the ions of the solution and driving them into the tissues to be sterilized. The strength of the current is increased to about three milliamperes for anterior teeth, and about five milliamperes for molars. The treatment is applied from one-half minute to three or four minutes duration, depending on the conditions present and the size of the teeth treated. Treatments are made every other day until pus flow ceases, and then at intervals of three or four days for several additional visits of the patient, at the end of which time, if all evidences of septic infection have disappeared and healing has occurred, the canals are ready for filling.

PERICEMENTAL ABSCESS

569. What are the *Symptoms of Pericemental Abscess?*

A discharge present is often of a whitish, glairy nature, usually midway between the apex and the gum margin, though sometimes at the gum margin, the condition then simulating a pyorrhea pocket. The abscess may sometimes be associated with pyorrhea beginning at the gingival margin, or with apical abscess, though a true pericemental abscess is associated with neither condition. The tooth may be dead or alive, since the active cause of the condition is often not due to death of the pulp. In true pericemental abscess, there is a history of trauma, in other cases a history of a gouty or rheumatic diathesis. There is usually little pain, except in the acute stages. The condition may be of an acute or chronic nature. In some cases the symptoms are quite vague, the patient complaining of "something wrong" with the tooth, which, on examination, shows a whitish, glairy discharge on the gum. An examination of the affected area shows destruction of the pericementum, a roughening of the root, and the presence of calculus, which, if chemically examined, frequently responds to the murexid test for urates.

570. Describe the *Treatment for Pericemental Abscess.*

If discharging at the gum margin, associated with pyorrhea, and the prognosis is good, the pocket should be curetted via that route, all calculus removed, the root polished, the tissues cauterized, and antiseptic washes prescribed. If the swelling occur on the gum, midway between the apex and the margin, a semicircular flap should be turned back, the necrotic area curetted, calculus removed, the tissues flushed with an antiseptic, cauterized, and the flap restored to place and stitched together. The mouth should be kept in an aseptic condition as far as possible during healing. If in connection with a dead pulp, that condition should receive appropriate treatment. Systemic medication is sometimes indicated, the institution of derivative measures or antigout regimen being resorted to.

REPORT OF THE COMMITTEE ON DENTAL SCIENCE AND LITERATURE

CALIFORNIA STATE DENTAL ASSOCIATION

DR. F. V. SIMONTON, SEC.
(FOR THE DENTAL SUMMARY)

A review of an article by Bertram B. Machat, D.D.S., Brooklyn, N. Y., appearing in the "Dental Cosmos" for September, 1920, and entitled "Causes, Prevention and Treatment of Prolonged Pain Following Extractions and Oral Surgical Operations," by Geo. A. Hodges, D.D.S., Turlock, Cal.

THE AUTHOR ATTRIBUTES the increasing number of extractions and oral surgical operations and their attending post-operative complications, chief of which is prolonged pain, to the recent advances made in roentgenology, perfection of conductive anesthesia and the recognition of the culpability of dental and oral lesions in the production of general disease.

The distressing phenomenon commonly known as pain, the author ascribes as having for its origin pressure upon sensory nerve filaments. "The duration and intensity of pain may be due not only to local agents but also to predisposing factors, such as the state of health, environment, nervous and psychic individuality of the patient."

The one constant factor in irritation is pressure, whether the cause be mechanical, chemical, physiologic, pathologic or electric. "To the dental sugeon this is of special interest, because of the anatomy peculiar to his field, namely, the constancy of highly vascular and exquisitely sensitized soft tissues in immediate contact with hard unyielding strucrures. Conforming with the foregoing—the study of the causes and management of after pain, the author takes up under the headings, 'Pre-Operative, Operative and Post-Operative Pain'."

PRE-OPERATIVE PAIN

Of foremost importance in the prevention of post-operative complications is the operator's ability to localize and recognize the true etiology of the complaint. To the exodontist and oral surgeon diagnosis should be fundamental. Pain has always been the most convincing argument for the extraction of a tooth, yet regardless of the intelligence of the patient, the location of the pain is not always a safe guide to the underlying cause, for unless relief is effected, even in the face of a successful operation, the surgeon is apt to be stigmatized.

We must remember that aside from pain, which in the mouth is frequently of referred nature, co-existing mixed trouble is not uncommon. Where general inspection and objective percusion, transillumination, thermic, electric, and radiographic survey have failed to localize the seat of the trouble, zone blocking is resorted to. Especially is this latter method valuable in cases of mixed dental lesions with a complaint of referred neuralgia. However, failure of objective verification places the case upon an expectant plan of action subject to further developments and final diagnosis.

With all the data at hand one should, at this point, be able to estimate the general psychic and local conditions pertaining to the case, correctly forecast the steps to be followed and squarely present the facts to the patient. With the hysterical and unreasonable individual, one must be extremely alert lest blame for unavoidable complications be placed upon the operator.

To my mind the dental surgeon, who is endowed with a knowledge of psychology in addition to operative judgment and skill, is best equipped for the management of nervous cases. Excepting in the case of hypertension, both vascular and thyroid, sedatives are seldom required. Extremes of blood pressure and a poor picture will prompt special precautionary measures and in rare cases may contraindicate the contemplated operation. Patients suffering from pernicious anemia, hyperthyroidism and advanced pulmonary, cardiac and renal conditions are poor subjects at best and no operation should be undertaken without the physician's cooperation. Acute infectious constitutional disease and wide-spreading local pathology contraindicate mouth surgery.

Primarily no one factor stands out more potently in the causation of prolonged post-operative pain than pre-operative protracted, acute, diffuse inflammation of the peridental tissues. Usually this condition may be satisfactorily treated by palliative rather than extensive surgical interference. In exceptional cases, scarification and the removal of the offending tooth under general anesthesia is indicated. Hence, the reduction of the inflammation to a quiescent state is desirable before a secondary operation for the excision of all diseased tissue is undertaken.

Again, where a quiescent condition obtains, general anesthesia has not been found advantageous. For not only is access to remote parts of the mouth difficult by the constant interference of the tongue, cheeks and secretions, but the recumbent position of the patient, the nasal or mouth inhaler and the evanescence of the anesthesia unavoidably hasten the operation.

Obviously, where a clean, clear and prolonged anesthetic field is desired, plus cooperation of the patient, circumscribed and regional or conduction anesthesia should be the method or choice.

The distressing symptoms which sometimes follow soon after the injection are due to: (a) faulty anesthetic, and (b) faulty injection.

FAULTY ANESTHETIC

First. Failure to employ a sterile isotonic medium or vehicle may produce various untoward symptoms.

Second. The epinephrin ingredient is responsible for the tachycardia and other disquieting symptoms. However, this ingredient varies in the different tablets which are now marketed by several manufacturers and a careful selection will obviate much of the trouble. The pre-operative administration of bromural 10 grs. the night before and one hour preceding the operation upon hypertension cases will prevent most of the trouble.

Third. The temperature of the anesthetic should approximate body heat.

FAULTY INJECTION

First. Too rapid injection is bad technic and bad judgment in infiltration anesthesia.

Second. Injection into a blood vessel is apt to be followed by immediate collapse, thus greatly disconcerting the operator. However, it is of short duration and with the exception of a slight soreness at the point of the puncture and lack of anesthesia of the part to be operated upon, nothing untoward is noted.

Third. Injection of excess anesthetic in fibrous and muscular tissues will produce vasomotor disturbance and aside from failure of anesthesia of the part intended for operation, may cause loss of function, sloughing, protracted pain, etc.

Fourth. Direct injection into a nerve trunk will produce instantaneous anesthesia. However, where a considerable quantity of the drug has thus been injected severe complications may follow, notably: neuritis, protracted anesthesia of the part supplied by that nerve, etc.

Testing for anesthesia should be objective rather than subjective, and in this respect the patient cannot always be relied upon. Manifestly, where mandibular anesthesia has reached the incisor region, it is sufficiently profound in the posterior part of the mandible, and only occasionally will such a case require long buccal injection for the completion of anesthesia. So with other zones where pinching with an instrument over the well-known landmarks elicit no reflex (no expression from the patient), anesthesia of the part has been reached. Let me emphasize that every step pertaining to anesthesia presupposes absolute asepsis.

The area to be operated on should be carefully sponged, dried and painted with aconite and iodin. At this point it should be remembered that reaction incident to repair of severed tissue will depend upon the extent of the injury and operation, hence every step will have to be designed with a view to minimizing surgical trauma. In this connection it has been found that even mild pressure against the roots of the normal teeth will produce post-operative pericementitis.

Careful curettage of infected tissue is imperative. This, however, should be done with intelligence and caution. Unwarranted scraping and mutilating will produce irreparable damage, especially where the dental canal and antrum have thus been invaded.

In all extractions, bony margins should be trimmed smooth and even with the alveolus of adjacent areas. Following inspection, and smoothing and trimming of alveolar margins and curettage if needed, the socket is irrigated, dried and iodized. A blood clot is then agitated and the wound is covered by a slight dressing and the flap sutured.

Dressings are used chiefly in the mandible, and even here it is intended rather as a check against the entrance of extraneous matter than as a drain. Tight packing is employed in hemorrhage cases only. In all operations where dressings are used they are changed daily.

POST-OPERATIVE PAIN

With regard to post-operative pain, it is significant that, despite miscellaneous methods of operation, adverse conditions, and generally an unaseptic environment, the great majority of extractions are successful. However, since surgical exodontia is on the increase, pain is frequently a sequel.

Careful check-up of the anesthesia and operative technic will solve many problems. Post-operative pain may often be traced to simple mechanical trauma. Pain confined to the operative zone will frequently be traced to dressings that, although well designed, when left too long become a source of irritation, chiefly because they block drainage and interfere with union.

A not infrequent condition met with by the general practitioner is the protracted pain in edentulous jaws which is usually associated with remote neuralgias. In connection with these cases, it is a curious fact that the dentist commonly advises waiting for the ''gums to heal" before he will be ready to insert artificial teeth. To the contrary, in cases where, owing to extractions the gingiva has been rendered vulnerable to attack by any agency, immediate ''shoeing" by means of base plates is recommended. Patients who can afford the added expense are advised to have a ''temporary" set without delay.

A most disquieting condition to both surgeon and patient is the protracted anesthesia mesial to the site of the operation—an evidence of sensory nerve injury. The patient may describe this condition as a burning, pinching, tingling and generally uncomfortable sensation. This is commonly seen in the mandible, although similar trouble has occurred in the zone covered by the infraorbital injection. Stimulation of the part is essential. The violet-ray, hot irrigation and massage are found helpful. In rare cases re-operation may be the only remedy.

Infected wounds will manifest that condition by the presence of pus or putrescent odor, or sloughed tissue, tenderness to palpation, glandular involvement, coated tongue, foul breath, headache, etc. Generally this condition is subacute. In the acute stage, local pain may be severe; septic temperature and leukocytosis is to be looked for. In the latter case free drainage, stimulating irrigations, the application of ice packs one-half hour alternately, hot foot baths, purgatives, liquid diet and rest is to be advised. In the quiescent state, removal of the necrotic tissue, proper drainage and frequent warm stimulating irrigations are indicated.

Trismus, in addition to severe pain, is not uncommon as a sequel to extensive surgery attending the removal of first and third impacted molars. Physiologic rest is an outstanding requirement in the treatment of these cases. The use of ice packs, liquid diet and the internal administration of

Acetanilidi grs. ij
Phenacetini grs. v
Caffeinae Citrat gr. j

D. t. d. to be made up in powders or capsules and taken four or five hours apart until pain is relieved, have been found effective.

In refractive cases the presence of a retained root or granuloma should be looked for. Where the findings are positive, re-operation at the earliest moment is advisable. Until then, treatment as outlined for the expectant plan is to be followed.

The prolonged pain incident to dry socket will be found unresponsive to treatment until curettage is performed and a healthy blood clot is induced. The principle followed in the treatment of wounds in other parts of the body holds good in the mouth. Immobilization, stimulation and cleanliness are the important factors in tissue repair.

Since our understanding of infection and immunity is becoming clearer, we are able to account for the marked systemic reaction that often follows the surgical interference or removal of an infected tooth; a condition significant of the lighting up of closed focal infection. This may occur not only in operations upon diseased teeth, but also in cases of extraction of numerous healthy teeth, but of a pyorrhetic environment. The absorption of toxins into the general sytem leads to toxemia. Where secondary foci are present these may become activated and a general violent reaction, characterized by all symptoms of an acute septic condition, may ensue. To the pathologist such a reaction is of value as a therapeutic test. Generally, there is a variable temperature, pain markedly all over the body, a pounding at the back of the head, lassitude, malaise, loss of appetite, etc., lasting from three to six days, after which the patient recovers rapidly.

In point of caution, it should be said that the lighting up of too many foci may also lead to the absorption of bacteria and consequent bacteremia. Since dental foci of infection usually harbor streptococci the danger of streptococcemia, a very grave condition, should always be a deterring factor in undertaking too extensive septic mouth operations.

THE AMERICAN RED CROSS

FOR A HEALTHIER AMERICA

No dentist needs to be told that a large percentage of our school children have defective teeth. He knows it from experience. He knows that thousands of these children are going to suffer later from the neglect of their parents. Neglect is prevalent in health matters generally. Half our school children suffer from physical defects, usually remediable. Three hundred thousand American babies die every year before reaching their first birthday. Three quarters of a million people die annually from preventable disease. The death rate over forty is rising.

What is the answer? Education and cooperation. If public health is to be improved it can only be done by these two means. The people must be taught the simple rules for safeguarding health, and they must have all the health resources of their various communities immediately available. Homes must be made safe, schools must be made safe, and public opinion must not stop when it has cleaned the home and the school, for too many industries are breeding places for tuberculosis, too many rat-infested factories stand witness to our ignorance. Human sewage, germ carrying vermin, flies at large, venereal disease, these all haunt labor and break down America's productive power.

The American Red Cross, when its war work drew to an end, considered this question, and then launched a nation-wide campaign for better public health—a campaign of education and cooperation. Although many of the Red Cross' war obligations are still unfulfilled, and much of its effort has consequently to be directed toward aiding the disabled soldiers and the destitute children of Central and Eastern Europe, it has accomplished a great deal already for public health. If the American Red Cross had accomplished nothing else than the recruiting of 19,877 trained nurses to stand behind our fighting men, to care for them when they lay dying, and to nurse them back to health, it would have justified its existence.

There are today 37,787 nurses enrolled in the Nursing Service of the American Red Cross. They are the reserve of the Army and Navy Nurse Corps and in certain emergencies of peace time as well as in time of war may be called upon for service by the Surgeons-General. At the present time the three governmental services are calling upon the Red Cross Nursing Services to provide additional nurses for their corps in order to give adequate care to the disabled ex-service men and nurses are being enrolled at the rate of about 100 a month.

The Red Cross not only enrolls nurses who have had professional education to fit them for active military service, but also aids in supplying the necessary education, in cases where it is lacking, through scholarships and loan funds. Nurses with special qualifications for special services, such as Public Health Nurses are also enrolled by the Red Cross.

Up to date the American Red Cross has furnished, from its reserve, 1,163 nurses for the Public Health Service for the care of disabled men, and these assignments will increase as the need grows. Aside from these federal activities it has furnished 1,335 public health nurses to Red Cross Chapters, giving health instruction and definite nursing service throughout the rural communities of the United States. It has furnished 1,726 trained instructors for the ''Home Hygiene and Care of the Sick'' classes. In connection with the work of destitute children in Europe, it is preparing and sending forward constantly nurses chosen for their special fitness for child welfare work. It is carrying on a continual campaign in behalf of the enlistment of student nurses for civilian Hospital Schools of Nursing—that the supply of young women may not fail—who shall keep alive a work so big with usefulness and self-sacrificing service for humanity. It is in close touch with the various nursing associations of the country, and is vitally interested in the Traning Schools carried on in connection with great hospitals. It is establishing and contributing to the support in Europe of training schools for nurses where modern nursing as we know it never has been developed, but is now made manifest as one of the paramount needs of war-torn, unhappy Europe.

One of the chief contributions that the American Red Cross Nursing Service has made to the American people is the public health nurse. She is working today in every state of the Union preaching a gospel of disease prevention and good health for everyone. She is the pioneer worker of her profession. She goes into the mountains, into the mining communities, and into the lumber camps on her crusade of health. Sometimes she must make her visits on horseback, sometimes on foot, and often on snow shoes or in her trusty ''flivver.''

A permanent weapon against disease is being forged in the American Red Cross course ''Home Hygiene and Care of the Sick,'' to the teaching of which 1,726 trained Red Cross nurses have been assigned. During the past year 86,570 women and girls completed this course and received their certificates. This work reaches out into the highways and byways of American life. Such classes, for instance, are held in the crowded high schools for girls in New York City, in the Kentucky School for the Blind in Louisville, and among the Piute Indian women on the Pyramid Rock Reservation in Nevada—wherever the need for this work is greatest.

Physicians' examinations have shown that about 20 per cent. of the school children of this country, rich and poor alike, are below normal weight for height and age. To aid in correcting this situation the American Red Cross Nutrition Service has developed three chapter activities, namely, Nutrition Classes for Undernourished Children, Hot Lunches for Schools, and a Course in Food Selection for Mothers.

This Service has enrolled up to date 2,514 trained Home Economics Teachers qualified to carry on these activities. From September 1, 1920, to June 1, 1921, 22,006 undernourished children were enrolled in 1,114 Nutrition Classes. One hundred and sixty-three classes in Food Selection with an attendance of 1,587 women have been reported.

While this service is often carried on independently by the chapters, it always seeks to work in the closest cooperation with the public health nurse and the National and State Extension Service in Home Economics.

Accidents kill more people in the United States in one year than that dreaded enemy—cancer, and nearly as many as influenza. Last year 75,432 people lost their lives from accidents. More than 200,000 persons were injured in railroad accidents alone. Thousands are killed in industrial accidents. Many of these lives might have been saved, a helpless cripple might be straight and strong today had somebody known what to do before the doctor arrived. Red Cross instruction in First Aid is offered that lives may be saved. Railroad systems, manufacturing and industrial corporations realizing the value of First-Aid, have, through the cooperation of the American Red Cross, made it a part of the training of their men. Every chapter of the American Red Cross is prepared to organize classes and furnish instruction in First Aid.

Last year in the United States 7,000 people were drowned. The American Red Cross is training Life-Savers in every part of the country that touches on water. Certificates have been issued to 6,096 persons showing that they have passed the rigorous examination necessary before membership is granted in a Red Cross Life-Saving Corps. Of this number 1,500 are women. There are more than 600 boy and girl members.

From January, 1920 to June 4, 1921, there were 70 disasters in the United States in which the Red Cross rendered relief. One hundred and seventy-seven chapters had to meet disaster emergencies. In these calamities hundreds of persons lost their lives, thousands were injured, more than ten thousand were made homeless, and millions of dollars worth of property was destroyed.

The American Red Cross must hear the "*alerte*" when it sounds, in order to render efficient assistance, for no one can know where the next disaster is to strike. The larger chapters keep disaster relief supplies in readiness as well as nurses and other relief workers, who can go at a moment's notice. Preparedness for Disaster Relief is a strong plank in the permanent American Red Cross program. Since 1881 the American Red Cross has expended more than $14,000,000 for the single purpose of disaster relief—such as the aid it gave when a cyclone struck a little town in Georgia, or rendered when the flood swept Pueblo. Both in Pueblo and at Tulsa, Okla., during the race riots, Red Cross nurses were among the first to reach and the last to leave the scenes of disaster, and in both cases worked for periods often of a week without pay.

All this work is a step in the right direction. But great as it is, it is only a step, when one considers the size of the field. Appeals for Red Cross are more frequent and more insistent than ever before. What has been accomplished is nothing to what may be accomplished if the American people support the organization in the future as they have in the past.

The Fifth Annual Roll Call of the Red Cross will be held from the 11th to the 24th of November this year. The Roll Call is neither a campaign nor a drive. It is simply the opportunity for all members to renew their memberships and for all who are not yet members to join. If you believe in the value of Red Cross work, it is your duty and your privilege to join.

SELFISHNESS promotes greed and arrogance. What good does it do us to have our hands in the other fellow's pockets all the time and yet be losing the finer things of life!

ETHICS*

BY W. A. BRYAN, M.D., F.A.C.S., NASHVILLE, TENN.

TO THOSE WHO HAVE NO CONSCIENCE, there is no ethics, nor any conscious need for it. To those who have deliberately espoused a vicious life in the broad sense or in a restricted sense, such as in the professions, there is no argument that can be made and no wise man would attempt such an undertaking. To the insane no such appeal could be made, and I have no doubt that the deliberate choice of vicious living is an irrefutable symptom of insanity. The vast majority of civilized human kind have a more or less completely developed consciousness of duty. In some it has so completely overgrown the other conscious functions as to retard them in their intercourse with men and make failures of their lives; for fear of doing something wrong they do nothing but fear. They remind one of some beautiful flowering plant that never bears fruit. The remainder have mingled in their lives selfishness, ambition, envy and numerous other qualities, which, if they are not properly controlled or coordinated, cause the individual to develop into a disproportioned thing that never finds a peaceful place in life, having no peace, giving none. A proper correlation of one's mental constituents is called poise, which is one of the superb attainments of life permitted only to the few. Poise is a rare gift, and cannot be hoped for by any who do not hold before themselves the ethics that must serve as their guide.

Ethics may be looked upon as general or universal, and special or professional. The former serves as our guide in matters of duty to mankind in general. The latter narrows itself in application to members of a cult, or order, or society, or profession, and embraces less than the whole of mankind. Now, the former is the fundamental law of duty as worked out by the accumulated wisdom and experience of the human family; it is the work of the philosopher, the sage, the seer, of the wise and good and inspired of all history. But the latter is the outgrowth of the former; it is not as broad nor as deep, and has of necessity *no right to supersede it under any circumstances.* Whatever special rule of ethics fails to comply with the general, the common law of duty, or ethics in its most comprehensive sense, is spurious and must sometime fail.

The fact I wish to impress is not yet clear. What I wish to say specifically is that no special rule of conduct can be valid when the general rule demands of us a different line of action. *No code of ethics of the dental profession can be useful to the profession, if the application of that rule does injustice to the patients who patronize the profession.* All special ethical codes must be founded upon the high sense of human duty.

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*Read before the Tennessee State Dental Society, May, 1921.

As man crept wearily through the aeons from darkness towards the light, as he dealt with his fellow-beings and found the growing necessity of continuing to deal with them, as he gave and received favors and persecutions, especially the latter, his obtuse brain must have early received the impression that there were right and wrong ways to do these things, and sometime when a congregation was gathered and every body in a good humor they must have discussed the elements of human duty. As civilization advanced and men multiplied, this elemental conception grew in its application, in ramification, until a fine structure called the code of ethics had developed, and then the most superb statement that has ever been uttered in the history of mankind concentrated the whole meaning of the history of ethics, and summed up the full substance of the code in the single sentence, "*Whatsoever ye would that men should do to you, do ye even so to them.*"

No honest man who can remember that sentence can go wrong in his ethics, general or special, and no intelligent man ever forgot it, once he heard it. It becomes a part of the soul. But there are men who are only partially honest, and others who are very little intelligent. To any such in the profession, let me suggest that repeating the golden rule three times a day until it finally becomes a part of you, is the best possible plan for developing a thorough gentleman from one who is more or less incomplete. But the rule must be repeated until it reaches out and touches every relationship you have either with the profession or with the public. This same rule occurred to Confucius, but he negatived it. It was still-born. When it came next it was in the affirmative, afire with the soul of God, and no man can afford to leave it off.

To the partially honest and the imperfectly intelligent members in a special organization like the dental profession, association with the better members of the profession will have an unmistakable tendency to polish them and to bring their status up to a point where their ethical conduct will be free from viciousness. Nearly all the really bad traits of respectable members of the profession are found upon intimate contact to be the result of a misunderstanding. When I was very young in my profession, one of the most useful pieces of advice came from a very dear friend, who told me to study the strong points of successful men and to incorporate them into my own life. How well I have been able to follow this advice, I will have to tell you when I am an old man.

It has been stated already that the general law of ethics was superior to any special application. This manifests itself specifically in medicine and dentistry when the necessity arises to decide between the patient's interest and the doctor's. It is not long, if one may prophesy, till it will be unethical for a dentist or a doctor to undertake to do something *he doesn't know how to do.* And I am sure no rule, no law would undertake to compel a member of a profession to recommend to the patient another member for a class of work which he was incapable of doing.

Neither does it compel him to say that a poor piece of work was excellent. No code, I believe further, requires one to go out of the way in search of some mistake made by another man, or deliberately to lie about good work that has been done by a rival. Of all the brutal, inhuman, unpardonable, disreputable, conscienceless wretches in the profession, this group stands at the forefront. And they are the troublemongers who haven't the very soul of decency, in the profession. They gain a bit of information, or they fabricate it, and, disregarding all decency, all manners, proceed swiftly and tell it to every itching ear for the hurt of their fellowman or for their own profit. This, and not quackery, is the dirtiest dirty spot on the professional name today.

There is a saying that every malpractice suit is the handiwork of some professional brother, deliberate or incautious. I do not think the statement true. But it is almost true. The ill-advised criticism of the work of one's superiors, and such criticism usually comes from an inferior member of the profession, is capable of being seized upon by the designing and causing trouble. A very good solution would be to say ''Let's have the doctor who did this work come down and learn from him just what the conditions were. Perhaps he did just as well under the circumstances as any one else could have done." Or if you would apply an ice poultice to the spinal column to the damage seeker and to the shyster who is egging him on, tell them that you are a self-respecting member of a great profession, and that you do not care to criticise your confreres or to hear them criticised. It pays better in the long run.

WHEN we elbow our way to get on the band wagon first and push the other fellow out of the way—every man for himself and the devil take the hindmost—the pity of it is that only a few get through and the devil gets the majority.

CORRESPONDENCE

THE HIGH FREQUENCY CURRENT

BY P. L. MARSHALL, D.D.S., MAJOR D.R.C., COLUMBUS, OHIO

To the Editor Dental Summary:

I WISH TO COMMEND DR. MILTON NEFF, of Cleveland, Ohio, on his able and scientific article entitled, "Harnessed Vitality," in the July edition of THE SUMMARY, and also note this is the first time to my recollection that the violet-ray high frequency current value to dentistry has been brought out in any of our magazines of today.

However, quite a good many of the profession have been trying it out in their dental therapeutics.

I would like to hear more of it through THE SUMMARY from other dentists, who have had long and varied experiences with the violet-ray high frequency current.

I believe violet-ray high frequency current is still in its infancy and that in due time it will be used for the treatment and cure of a great percentage of diseases needing cell stimulation and increased functional vitality.

I feel that my experiences with the violet-ray high frequency current have been very encouraging and helpful to my patients for the relief of neuralgia, which, we all know, has been a source of worry to a great many of the general practitioners. My observations and experiences have been for a period of the last twelve years, two of which were in the United States Army Hospital as dental sugeon.

Following are some observations I have recorded:

First. The ozone or energized oxygen produced is forced through the tissue and cells, stimulates the circulation, breaking up the congestion, and helps promote the regeneration of the cellular tissue.

Second. The ozone in connection with iodin applied over the infected area is carried directly to the seat of congestion acting as sedative and anodyne.

Third. I believe the ozone generated from current also acts as a germicide and disinfectant, thereby, bringing tissues to normal condition.

Fourth. We have all been taught and know that any deviation from a state of health is disease, characterized by a rapid onset and short course; therefore, we have at our command (in my opinion) one of the best instruments to help bring back health to the human body, the violet-ray high frequency current.

Fifth. I sincerely believe that the unseen electrical force and the ozone produced from it in our body, and the air we inhale is the great equilibrator of the healthy body; without it our resistance becomes lowered and vitality gone we become the easy prey of disease.

Sixth. It is a fact that in the cities and congested parts of the country there is very little free ozone, especially indoors. Therefore, the patient is advised to change climate to a higher altitude, where the ozone is many times increased.

By the use of the violet-ray the electric current passing through the oxygen converts it into ozone, which we know is pure and necessary for our health. Electric spark passing through the air is ozone. Ozone is chemical symbol O_3 and is a concentrated form of oxygen. The ozone is readily recognized by its distinctive odor given off from the rays or cathode.

Have found the rays very beneficial for stimulating the gums and membrane of pyorrhetic cases after the proper prophylatic measures have been carried out.

Would appreciate it very highly to hear from some of our brethern more scientific than myself, and hear the pros and cons of this agent through the journals.

647½ North High Street.

AN OPEN LETTER

BY VICTOR H. SEARS, D.D.S., SALT LAKE CITY, UTAH.

Mr. Geo. L. Roth,
Memphis, Tenn.

Dear Sir: Your very interesting paper, read before the Memphis Dental Society and appearing in THE DENTAL SUMMARY, has just come to my attention. It is of such a nature that I wish to reply to it.

Speaking of the terms used in my paper you say: "They help to hide the one big fact so obstinately ignored by Dr. Sears and the rest of the dental profession * * * ." The one big fact you refer to is: "the reality of a definite vocation." Now, if you will read my paper again, you must see that I am not "obstinately" ignoring the reality of a definite vocation. On the contrary, I am making a definite plea to the schools and to the profession for the recognition of and cooperation with the commercial laboratory.

Your phrase: "Dr. Sears and the rest of the dental profession," and your general attitude throughout your paper, give the impression that you believe my paper to have been written purely from the standpoint of a practicing dentist; but let me assure you that I speak also from the viewpoint of a teacher and of a laboratory proprietor. During the ten years prior to my entering dental college my time was largely given to actual bench work in one of Chicago's then largest commercial laboratories, so that much of my attention has been devoted to the commercial laboratory. Under these circumstances you will appreciate the fact that your side of the question was by no means left out of account. Also my paper, before it was delivered at the convention, was sent to some well-known laboratory proprietors in New York and Chicago, as well as to some college instructors of prosthetics; with their criticisms and suggestions I felt that the ground had been fairly well covered. After receiving all of the other comments on this paper it was quite a change to read your words in italics: "It failed to show the faintest perception of the far-reaching issue that is really involved."

There are a few other statements in your paper which might be commented upon, but after all, my real reason for paying any attention to it is that you, perhaps unconsciously, display a bellicose attitude toward (1) the dental colleges, (2) the National Dental Association, and (3) the rank and file of dentists. Even then it might not be of any particular importance were it not that I know from actual contact with laboratory men from all parts of the United States that your attitude is typical of a number of men who do the bench work for our profession. What I am about to say to you applies with equal force to some others who feel as you appear to feel toward dentists and non-commercial dental institutions.

Take first the colleges. The following quotation from your paper is substantially the same as many other more or less voluntary admissions made to me by laboratory workers: "Resourceful dental students, who are really determined to acquire a practical knowledge of prosthetic technic, are generally wise enough to make friends with an experienced laboratory man. They are fully aware that they can learn more from him in a few hours of their spare time than they can from their own professors and demonstrators in the entire four years at college." Oh, Modesty! Where is thy cloak?

Again you say: "If the present college faculties are incapable of providing sufficient instruction in prosthetic technic to the dental student to prevent him from becoming a dependent of the cheapest commercial laboratories, how in the name of common sense can they ever hope to train dental technicians?" It is a fact that the average laboratory man does *some* things better than they are done in the average dental college, but for the laboratory man to feel that he knows more about prosthetics in general than does the college professor, is somewhat like the man who lays the bricks assuming to know more about buildings than does the architect. The fact that laboratory men do some things better or more quickly than do prosthetic teachers would be no basis for assuming that the student could learn more from a laboratory man in a few hours than he could learn from a college professor in four years.

There is much that the laboratory man may learn from the dental college but until he is willing to admit that this is so he will continue to view the matter from his own standpoint alone. The laboratory man needs, and should have, the cooperation of the dental colleges. Some day it will come, but your attitude, as expressed in your paper, is the attitude which shuts the doors to cooperation. The college professor is not such a bad sort if you do not pretend to know more than he does. You may rely upon his support if you bid for it and do your part.

Next, you voice your disdain for the National Dental Association. Among other things you say: ''At present the National Dental Association, rather than sanction any exposure of the real proportions of professional incapacity, will only tolerate an address upon this subject which consists of twaddle so inane that it would embarrass a lunatic asylum, and make a crowd of chattering imbeciles blush for shame for the human race.'' This outburst should be regarded perhaps more as an oratorical flight than an expression of your exact meaning, and yet it does show an unmistakable disrespect toward an organization which is doing a great work for the advancement of dentistry. The National Dental Association has been the greatest single factor in raising the standards of the average dentist and is not open to your charge of suppressing facts. As an active N. D. A. member I resent the implication that I did not dare speak my mind as well as the implication that the Association would not permit me to do so, and I hope you will be willing to concede your error in the above quoted statement. When the laboratory man is willing to work *for* the N. D. A. instead of *against* it we shall be one step closer to complete harmony.

Not satisfied with ridiculing the colleges and the N. D. A., you feel called upon to denounce modern dentistry and those who practice it. Referring to me you say: ''Of course, he and everybody else knows that modern dental practice is a positive menace to the general public * * * .'' After describing the crude dental restorations with which your are familiar, and after dilating upon the huge number of "monstrosities" turned out daily by the commercial laboratory you exclaim: ''This is modern dentistry!''

This is *not* modern dentistry. Fortunately the real leaders among the commercial laboratory men are trying to produce restorations which exemplify the best work of modern dentistry, in place of the ''monstrosities'' which you describe. With rare lack of diplomacy you condemn the efforts of your own clients by saying: ''When we compare the pretenses of the average dentist with his actual accomplishments, the conclusion is forced upon us that so far modern dentistry is not merely an abject failure but an abominable disgrace.''

It will be admitted that much of the work being done today is far from what it should be, but every intellegent observer of the dental world must also see that today there is a concerted effort toward improvement unequalled in any other period. Under these circumstances it ill becomes anyone to besmirch the name of American Dentistry.

When you appeared before the Memphis Dental Society you had a golden opportunity to place youself on record as one who is willing to cooperate with the workers in fields of dental activity other than your own. You could have used your time to offer some constructive suggestions to bring about closer harmony and improved dental service. Instead of this, you chose the more spectacular and less becoming attitude of fault finder.

Now, Mr. Roth, I do not believe your paper does justice to your views. You appear to have been actuated more by a desire to tickle the ears of your auditors than to offer any contribution to the progress of dentistry. Nowhere in your paper do you seem to suspect the fact that you are the representative of the commercial laboratory and that your remarks might serve on the one hand to cement more closely the bonds of good feeling between the laboratory worker and the rest of the dental world or, on the other hand, that they might react to the discredit and disadvantage of the commercial laboratory. If the opportunity again presents itself, I hope you will feel more inclined toward constructive effort. Cooperation among the workers in all dental activities is the ideal toward which we should strive.

Salt Lake City, Utah,
July 12, 1921

When using Novocain

For the benefit of those who are interested in novocain and for those who are about to take up its use, I may say that for a number of years it has been my practice to give my patients a half-teaspoonful of aromatic spirits of ammonia in half a glass of water ten to fifteen minutes before injecting the novocain solution. In following this plan I have not been delayed, have had practically no symptoms of fainting, and the results altogether have been most satisfactory to myself and my patients.—*H. M. Beck, Hettinger's Dental News.*

EDITORIAL

THE AMERICAN COLLEGE OF DENTISTS

For some time it has been known that a college of dentists was being organized but few dentists knew the objects and aims of the organization and many have made inquiry about it. For the benefit of those who are not conversant with the facts, a statement at this time may prove enlightening.

In the first place The American College of Dentists is not a teaching proposition. It has been organized by members of the profession who have banded themselves together for the advancement of dentistry by recognizing and rewarding men who have accomplished some meritorious work for the good of the profession and humanity, for the stimulation of graduate study and the rewarding of the same when it has been accomplished; also for the stimulation of extension work in the profession by formation of study clubs under proper direction, and the bestowal of the Fellowship upon all men that have risen above the ranks in whatever department of the profession their activities may have been.

No applications for membership are received, but any member of the College has the privilege of nominating a member of the profession for Fellowship. The name goes to the Board of Censors who investigate thoroughly the merit of the work done by the individual and if found worthy he is recommended to the Regents for the Fellowship and it is conferred at the next convocation.

The dues and fees are indicated to the men who are elected to Fellowship, when apprised of their election.

The present officers of the College are: J. V. Conzett, President; H. E. Friesell, Vice-President; A. L. Midgley, Secretary; C. Edmund Kells, Treasurer.

The College has just issued an official statement of the objects and requirements for Fellowship, as follows:

"Every important profession, science or art has its Academy, Legion, or Court of Honor, to which are elected, or appointed, those who have unselfishly devoted themselves to the advancement of each specific cause. This has been done not only as a just recognition of meritorious services, but also as an example to younger members that they may be encouraged to nobler efforts.

Recognition of the need of a similar influence in dentistry has resulted in the establishment of the American College of Dentists. The object of this College is to bring together in a group the men of outstanding prominence in the profession and by their united efforts in a field that is not now covered by any dental agency to endeavor to aid in the advancement of the standards and efficiency of American Dentistry. Some of the aims of the College are to cultivate and encourage the development of a higher type of professional spirit and a keener sense of social responsibility throughout the profession; by precept and example to inculcate higher ideals among the younger element of the profession, and hold forth its Fellowship as a reward to those who faithfully follow such ideals; to stimulate advanced work in dental art, science and literature; and to honor men who have made notable contributions to the advancement of our profession.

The enormously increased responsibilities of the dental profession to humanity on the one hand; the unprecedented opportunities for exploitation, which have resulted in a wave of mercenary practices that threatens to become a public scandal to the everlasting disgrace of American Dentistry, on the other hand, demand that those elements of the profession, whose character, reputation and professional attainments point them out as leaders, should be brought together for the purpose of checking the tide of destructive agencies and of encouraging by every laudable means the cultivation of that high spirit of professional and social responsibility, the wholesome influence of which is so greatly needed.

Inasmuch as there is no title or mark of distinction to differentiate the recent graduates from the practitioner who has devoted many years of faithful effort in the upbuilding of his profession, it is proposed that the Fellowship of the College shall be conferred upon two groups of practitioners, viz.:

One. Upon those members of the profession who have been at least ten years engaged in the practice of dentistry, whose efforts during that time have been loyally devoted to its advancement, and who are unquestionably looked upon as leaders in their respective communities. Time and effort devoted to teaching in dental schools, to presenting papers, or clinics before dental societies, or to organization and executive work of a constructive character; as well as public services or civic duties having a tendency to enlarge the usefulness or the public appreciation of dentistry, shall be taken into consideration when passing upon candidates of this group.

Two. The conferring of the Fellowship shall be held out as a stimulus to young men to induce them to engage more earnestly in those activities which tend to advance dentistry as a profession and for which monetary remuneration must necessarily be sadly out of proportion to the time and effort expended. Devotion to teaching, especially in the non-clinical branches; to research work and to public education, as well as advanced work in the art, science or literature of dentistry, should be greatly encouraged as a consequence of this movement.

The candidate for the Fellowship in either class must be of good moral character, and have a reputation for ethical conduct and professional standing that is unquestioned. Personality, integrity, education, unselfishness, and high professional ideals, as well as freedom from mercenary tendencies, shall be considered in evaluating the qualifications of all candidates for the Fellowship.

HEALTH TALKS

Attention is called to a paper in this issue of THE SUMMARY written by W. Linford Smith and entitled: "A Plan for the Ethical Dental Education of the Public."

The paper was read in the section on Mouth Hygiene and Preventive Dentistry at the National Dental Association, in August, by Dr. Rea Proctor McGee.

The paper suggests another method of dissemination of the knowledge of dental and oral hygiene among the masses. In brief the suggestion is to print on postal cards a series of twelve messages, or health talks, of approximately 150 words each, and to arrange for their widest possible distribution through the co-operation of the individual dentist in his local community.

The National Dental Association approved the plan as presented, and granted permission to print on the face of each card it is proposed to distribute, the fact that the subject matter has been approved by the National Dental Association. Dr. Otto U. King, representing the association has been appointed to serve on the Board of Trustees having this matter in charge and which will function under the name of The Dental Welfare Foundation. Members of the American Trade Association appointed to put the plan in operation are: A. S. Carman and J. C. Forstbauer, of New York; William C. Smith, of Milford, Delaware, George F. Jones, of Omaha, and Linford Smith, Pittsburgh, as chairman.

The National Dental Association is wholly and completely relieved of financial responsibility in the undertaking. Should a deficit result it will be paid by the American Dental Trade Association.

The Educational Campaign of The Dental Welfare Foundation will be operated entirely without profit to any individual or firm, or anyone else.

Should a profit result, it will only be used for educational projects in this or other directions such as will meet with the complete approval of the authorities of the National Dental Association, represented by the Council on Mouth Hygiene and Public Instruction of the National Dental Association.

If the Educational messages to be sent out each month do not meet with approval of the Council, they will be modified in any way which may be suggested, or other messages will be substituted at the desire of the Council.

Should unprofessional use be made of the service by subscribers, such subscriptions will be cancelled, the names received from the subscriber removed from the files and unexpired portion of subscription returned. The final authority upon what constitutes unprofessionalism will rest with the National Dental Association through its Secretary.

The Dental Welfare Foundation will submit to the Secretary of the National Dental Association for approval, every piece of printed matter that is to be issued in connection with the campaign, and will issue no printed matter without such approval.

Further detail will be omitted from this editorial for we want you to read the paper feeling assured that every dentist is interested in any movement that has for its object the ethical distribution of health messages for the welfare of the public.

Corks for Polishing Plates

I read recently in the pages of your journal that a cork made an excellent buff. I may add for the information of your contributor, that if, after turning the cork into a suitable shape to fit the curve of the palate—and while it is still turning—he will wind on a thin covering of cotton wool, he will then have a surface which will hold the pumice and glycerin perfectly and increase the efficiency by a hundred per cent. besides providing a binding to prevent the splitting of the cork by the conical screw. Should it be impracticable to turn a cork down to the narrowest demands, then substitute one of those vulcanized rubber bottle stoppers which come to us with some of the chemical preparations. These can be trimmed down to the smallest requirements without splitting. The base end of the stopper, with its square and sharp angle, can be used for polishing right up against the backs of the front teeth, simplifying that matter, too.—*J. S. Darton, Dental Science Journal of Australia.*

SUGGESTIONS

Conducted by F. R. Chapman, M.S., D.D.S., Columbus, Ohio

(*To Our Readers: Give others the benefit of your practical suggestions by sending a description of them to Dr. F. R. Chapman, Schultz Building, Columbus, Ohio.*)

Removing Compound from Model

Many times in removing the modeling compound from the plaster model, by using the warm water of slightly too high a temperature or allowing it to remain too long in the warm water, small particles or films of the compound will adhere to the model, which if removed by the ordinary method of scraping will mar the model, so to overcome this difficulty use a piece of the compound heated in the warm water and touch to the films remaining on the model, and it will be found that they are readily removed leaving a neat, clean model.—*Helen Seely, Salem, S. D.*

Haemostatics

As a hæmostatic, turpentine, in my opinion, is superior to anything else in dental cases. I have had cases where Monsel's salt, adrenalin and others failed. Put in a plug of cotton wool saturated with turpentine, and bleeding will cease, and, furthermore, the socket will heal in a clean manner, a characteristic not possessed by any other drug.—*Fredk. C. Deakins, Dental Science Journal of Australia.*

To Remove Rouge and Tripoli from Finished Crown and Bridge Work

Drop the finished bridge work in a small glass of aromatic spirits of ammonia (about 66% alcohol) for a few minutes only, then saturate a piece of cotton with the contents of the glass, and it will be found that all the rouge, etc., will easily be removed with this cotton.

This is particularly good for those who use plain pin facings, as often the glazed surface is touched with the finishing stones and leaves a rough surface which retains the rouge, etc. Try this once.—*John C. Houchins, Dental Facts.*

Consideration for the Patient

After removing the rubber dam apply a little tincture of aconite and iodin to the gums. This will serve in a measure to ameliorate that "used-up" feeling of the mouth which so often follows oral manipulations.—*Oral Health.*

Sterilizing Hand-Pieces

Into a suitable dish which will allow them to lie flat, put enough common vaselin, when melted, that will cover them. Bring to heat on the gas burner just below the point where it begins to smoke, and allow to remain a few minutes. Then take out with pliers, allow to drain and when cool, wipe off with a cloth kept for that purpose.

This temperature is considerably above the boiling point of water and not only sterilizes but thoroughly lubricates, and also keeps the hand-pieces in good working condition.

The vaselin being a semi-solid will not work out on the hands in use as the ordinary oil will.—*F. P. Simpson, Dental Digest.*

Cleaning Instruments

Partly corroded and rusted instruments can easily be restored to good condition by immersing them all night in a saturated solution of chlorid of tin, after which they should be rinsed and rubbed with chamois.—*Dental Outlook.*

To Prevent Checking of Porcelain in Casting

When casting on porcelain turn the investment over immediately, so the button of surplus gold is excluded from the air, allowing the whole to cool evenly. The facing will not check when this is done promptly. This also applies to solder work.—*J. S. Bridges, Dental Facts.*

Time Saver in the Preparation of Novocain Solutions

In the preparation of novocain solutions often considerable time is used in holding the dissolving cup over the flame waiting for the distilled water to boil down to the proper volume. As a time saver, I have devised a simple wire holder which anyone can construct in a few minutes.

Take the ordinary wire holder for the ten-cubic centimeter dissolving cup and bend the cup-holder part at right angles to the twisted wire stem. Then bend the other end of the wire holder, the loop part, also at right angles to the twisted wire stem. Now cut the loop in the center and curl the two ends of wire around the cone-shaped neck of an alcohol lamp, twisting one end downward and the other upward. This makes a very practical dissolving cup holder, which sets firmly and can easily be lifted off of the lamp.—*G. A. Schmutzler in Cosmos.*

SOCIETY·ANNOUNCEMENTS

Iowa Dental Examination

The Iowa State Board of Dental Examiners will meet for the purpose of examining candidates for a license to practice in Iowa, at Iowa City, College of Dentistry, beginning December 5, 1921 at 9:00 A. M.

For further information and application blanks, address

Dr. C. B. Miller, *Secretary,*
726 Fleming Bldg., Des Moines, Iowa.

Chicago Dental Society's Annual Clinic

The annual clinic of the Chicago Dental Society will be held at the magnificent new Hotel Drake, January 19, 20, 21, 1921.

This hotel is peculiarly well adapted to the needs of a large sectional meeting as has been planned for this occasion. Many commodious sound-proof rooms will be provided for the lectures and demonstrations, while the space for the general sessions and exhibits will meet all requirements, and is ideal in every particular.

The program, which will be announced at a later date, will surpass anything yet attempted by this component society.

For convenience, out of town guests should make their reservations at the Drake, and they should be made as early as possible, as there will be a large attendance from outside Chicago. All ethical dentists are cordially invited.

Further information will be cheerfully given by addressing,

M. M. Printz, *Secretary,*
25 E. Washington Street, Chicago.

Societe Francaise d'Orthopedie Dento-Faciale

On May 22nd, was founded the French Society for Dento-Facial Orthopedia; the following officers were elected:

President, Dr. J. T. Quintero, of Lyon; vice-president, Dr. E. Gallavardin, of Lyon; secretary, Dr. B. de Nevreze, 20, Rue de Mogador, Paris, 9; treasurer, Dr. E. Hollande, of Chambery, Savoie; editor, Dr. P. Ollagnier, of Saint Etienne, Loire.

The next meeting will be held in Paris at Christmas. For all information address the secretary.

Pennsylvania State Board

The next regular examination of the Pennsylvania Board of Dental Examiners will be held in Philadelphia and Pittsburgh on Wednesday, Thursday, Friday and Saturday, December 14, 15, 16 and 17. The theoretical examinations will begin on Wednesday, December 14th, and will be held in the Musical Fund Hall, Philadelphia and the University of Pittsburgh, Pittsburgh. The practical examination will be held on Saturday, December 17th, at the Philadelphia Dental College and the University of Pittsburgh.

The examination for dental hygienists will be held at the same places on December 15, 16 and 17.

Application papers for the above examination may be secured from the Department of Public Instruction, Harrisburg.

Alexander H. Reynolds, *Secretary*,
4630 Chester Avenue, Phila.

Kansas State Board

The Kansas State Dental Board will meet in Wichita, December 12th beginning at 7:30 P. M. Headquarters at Hamilton Hotel. For further information write the undersigned,

G. F. Ambrose, D.D.S., *Secretary*,
El Dorado, Kansas.

Michigan Dental Examination

The next examination for candidates wishing to practice Dentistry in Michigan will be held in Ann Arbor during the week beginning Nov. 14th. All credentials and fees must be in the hands of the Secretary not later than November 4th. For application blanks write to E. O. Gillespie, 745 David Whitney Bldg., Detroit, Michigan.

E. O. Gillespie, *Secretary-Treasurer*

Susquehanna Dental Association

The Fifty-eighth Annual Meeting of the Susquehanna Dental Association of Pennsylvania, will be held at the Armory, Easton, Penna., Oct. 18, 19, 20, 1921. W. M. Skinner, Easton, Pa., Chairman of executive committee; George C. Knox, Middleton, New York, recording secretary.

OBITUARY

THOMAS HERSHEL WHITESIDE

THOMAS HERSHEL WHITESIDE

Died at his residence on Midlothian Blvd., Youngstown, Ohio, July 13, 1921, of diabetes, Thomas Hershel Whiteside.

While in failing health for almost a year, Dr. Whiteside continued in active practice until December last.

In the passing of Dr. Whiteside, not only did the dental profession lose one of its finest characters, but the clientele he served has suffered an irreparable loss; the city lost an honorable, upright and esteemed citizen, one of its most familiar figures, and the friend of all with whom he came in contact.

On account of his unusual skill as an operator and his consistent conservatism, together with his genial and kindly nature, he was dean of the dental profession in the city of his adoption, and surrounded himself with a host of loyal friends and patients who remained constant through all the years of his service.

Aside from his professional duties, he devoted much of his time toward the fostering and development of amateur horticulture in the city, and had reached a stage of perfection wherein the results exacted the praise and credit of those who followed this line of endeavor as a business.

He was an ardent believer in social and community development and took a keen interest in the civic affairs of his home city.

Dr. Whiteside was truly a professional gentleman and was ever ready to assist any or all of his co-workers, giving them the benefit of his experience and skill and was a genuine inspiration to many of us who took up the work here during the long years of his service.

Thomas Hershel Whiteside was born at Harmonsburgh, Pa., August 29, 1849, and was the son of James and Mary M. Nelson Whiteside. He attended college at Meadville, Pa., and at the age of nineteen became assistant to Dr. Elliott of that city. Graduated in dentistry at the Pennsylvania College of Dental Surgery in Philadelphia in 1876; had practiced a few years in Jamestown, Pa., before graduation, and remained there until locating in Youngstown about 1881. Was many years a member of the Northern Ohio Dental Society; joined the Ohio State Dental Society in 1906.

He was instrumental in organizing the Youngstown Dental Society October, 1908, which now has a membership of seventy. Assisted in the organization of The Corydon Palmer Society, March 10, 1913, embracing Trumbull, Mahoning and Columbiana Counties, which is a component of the State and National Associations. Was the inventor and patentee of the Whiteside Crown, and Whiteside Bridge Crown, the post of which involves the step principle, the patents now being owned by The Dentists Supply Company of New York.

Was married in 1874 to Miss Florida Greer of Adamsville, Pa., also a dental graduate, who survives, together with three sons and one daughter, James G., William H., Frank P. and Mrs. Venice Lamb.

The oldest son, Dr. James G., graduated in dentistry and for a number of years practiced with his father, and is now in the dental supply business in Youngstown.

Also surviving is a younger brother, Dr. J. N. Whiteside, practicing in Youngstown, and two sisters, Mrs. Arthurholt and Miss Kate Whiteside of Erie, Pa.

Fraternally Dr. Whiteside was a Mason, being a member of the Sharon, Pa., Commandery which organization conducted the burial service in Belmont Park Cemetery, Youngstown, on July 15.

On November 12, 1919, the Youngstown Dental Society tendered Dr. Whiteside a testimonial banquet upon completion of "Fifty Years in Dentistry," and presented him with a loving cup in token of their esteem and affection. Present on this occasion were some of the old associates of his college days and friends from distant cities, and he informed the writer that nothing in his dental career had ever touched him so deeply.

"To die is landing on some silent shore
Where billows never break, nor tempests roar;
E're well we feel the friendly stroke, 'tis o'er."

—W. H. H.

Coin Fillings

Coin silver is the only silver procurable for dental amalgam in Albania. So now the patient who climbs into the operating chair to have a cavity or two plugged, usually has to search diligently in his pockets first to find an elusive dinar straying around in its depths.

The first corrective dentistry performed in Albania for seven hundred years is being done at the American Red Cross Dental Hospital. All dental treatment is given free. But now that necessity requires the dissolving of a silver dinar in mercury for practically every paitent, the stock of American Red Cross dinars rapidly diminishes and therefore must be carefully guarded for those patients who have no coins of their own.

Ailments of the teeth and mouth of Albanian women have been aggravated under the Turkish regime by the introduction of the woman's veil. These veils are filled with poisonous dyes which sooner or later infect the mouth and prematurely rot the teeth. These Mohammedan women of Albania smoke their cigarettes through the veil and frequently drink water without lifting it, if they are at a public drinking fountain.

The Red Cross dentists are receiving patients for treatment at Tirana, Durazzo, Kavaja and Elbasan. During the month of March their combined clinics received nearly one thousand Albanians, most of whom required treatment. Expeditions are being organized to the mountain villages where the natives are in dire need of dental work, following their deprivation from meat since the war and their dependence upon cereal foods.

FIRST AID

No other than a physician knows better the value of intelligent First Aid treatment. Times without number, doctors have answered hurry-up calls to scenes of injury only to find the victim beyond help. First Aid at the proper moment might have saved the life.

For example: Recently in an Ohio City, a man who had taken First Aid fifteen years ago when a member of the National Guard, applied artificial respiration to a six-year old boy who had fallen into a well. The child was rescued from the well in a state of absolute asphyxiation and was revived by the manual method of artificial respiration—Schafer method. The doctor who called gave this man complete credit for the child's recovery.

An extreme of First Aid is the person who does not know what to do. In this case a physician finds a patient who needed immediate attention surrounded by a group with an attitude of helplessness and with a more or less hysteric complex.

Another extreme is a person who does too much—the so-called meddlesome type of First Aid, the individual whose work has a tendency to throw an industrial surgeon into a state of apoplexy. Here we have the axiom "a little knowledge is a dangerous thing." This individual has not learned real First Aid, which properly taught means no more or less than the term implies.

It is the aim of the American National Red Cross in teaching this subject that the person who does First Aid must be simply the practical intermediary between the accident and a physician. This is the policy followed by the directors of First Aid in the thirteen divisions of the Red Cross in the United States.

The "what not to do" should be stressed even more than the "what to do." For example: When a man restrains another from putting an unclean hankerchief on a wound —a very common error especially in industries—that man does good First Aid work. When the First Aider realizes the end results of local or general infection, realizes the necessity of the tourniquet in certain types of injuries and the danger of allowing it to remain for a indefinite period, bound tightly to the limb; when the layman ceases to practice the nonsensical treatments of burns in the home and factory, and when the so-called "eye-doctor", the man in a shop stops using ridiculous methods of removing foreign bodies from the eye; when these things are learned the physician who is made responsible for the case has been rendered able assistance.

A prominent industrial surgeon in the state of Washington dealing principally with accidents in the lumber industry said that as a result of First Aid instruction and equipment in his mills and camps, infection was reduced about ninty per cent. and disability time lessened.

The sum and substance of the entire First Aid question, lies in the statement: "First Aid is merely applied common sense based on extra knowledge." The physician who by direct or indirect instruction gives his class the idea that they are amateur physicians or surgeons has made a failure in teaching his class.

The little things that mean so much in time of accident and emergency are taught in Red Cross First Aid classes. The instruction is given under the direction of local committees with a physician as chairman, appointed by Red Cross chapters. Usually a physician is teacher of the classes but the privilege of instruction is granted to any person who has successfully passed First Aid tests, if that person is under supervision of a physician.

As the program of the Boy Scouts, First Aid is a primary essential. In factories, lumber yards, mining camps, stores and business and private groups of all kinds, First Aid is being taught. Many schools are adding to it their regular curriculum. In the state of Pennsylvania, a law recently has been passed which will include Safety and First Aid instruction in the schools.

First Aid in connection with Red Cross work has two other distinct branches besides instruction classes—life saving corps and training of sanitary units for service in time of disaster of any kind. Life-saving corps in the Lake Division are organized in Akron, Cleveland, Columbus, Cincinnati, Dayton, Springfield, Toledo and Youngstown, Ohio; Indianapolis, Ind. and Ashland, Covington, Lexington and Louisville, Ky.

The peace-time program of the American Red Cross includes First Aid and Home Hygiene instruction—preparedness for disaster and emergency relief, extension of Home Service and Junior Red Cross activities for children in the schools.

As the government and local health agencies are the answer of science to the actual disease or prevention thereof, just so in First Aid the answer of organized lay knowledge to accident and injury.

MANY of our troubles come because we are ignorant of each other. We don't know that in this way we throw the wrench into the machinery and dynamite the bridges behind us.

NEY'S LINGUAL BARS

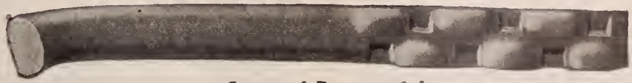
(Patent Pending)

Retain their temper when annealed and soldered

Three Forms:

Regular, Right *and* Left Extended

Made of 16K Clasp Gold, in improved form, with special corrugated ends to secure superior retention.



Section of Bar magnified

Supplied in the following forms:

1. Regular, Small - - -	$2.00	4L. Left Extended, Medium -	$2.75
2. Regular, Medium - -	2.25	4R. Right Extended, Medium,	2.75
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HARTFORD, CONNECTICUT, U. S. A.

NEWS and OPINIONS

CONDUCTED BY G. E. HARTER

Ethics may be looked upon as general or universal, and special or professional. The former serves as our guide in matters of duty to mankind in general. It is the fundamental law of duty; it is the work of the philosopher, the sage, the seer, of the wise, the good and the inspired of all history. The latter is the outgrowth of the former; it is not as broad nor as deep, and has, of necessity, no right to supersede it under any circumstances. Whatever special rule of ethics fails to comply with the general, the common law of duty, is spurious, and must some time fail. No special rule of conduct can be valid when the general rule demands of us a different line of action. *No code of ethics of the dental profession can be useful to the profession if the application of that rule does injustice to the patients who patronize the profession.* —W. A. Bryan, M. D., F. A. C. S., in "Ethics," printed in this issue of THE SUMMARY.

I have been waiting a long time for somebody besides myself to tell the dental profession just that, hoping that it would be a dentist. It is precisely the doctrine I have tried to preach ever since dental organizations began calling on me for talks. Now, turn over the pages of your magazine and read the entire article, remembering that the good old law of compensation is always "on the job," and that there is no escape from individual responsibility. "Do right, it recompenseth"; do one wrong, the equal retribution must be made."

It is not long, if one may prophesy, till it will be unethical for a dentist or a doctor to undertake to do something that he doesn't know how to do.—From the article quoted above.

I have read somewhere, that, away back in old Egypt, in the early dawn of medical practice, if a doctor undertook to treat a case and the patient died, the death of the patient was taken as ample evidence that the Doctor had no right to live, and he was promptly sent to join his patient in the Land of Shadows. Can one help wondering how many physicians would be left alive if that law applied now? Was it an unjust law? No physician was compelled to undertake any case; neither was he required to leave the patient better than he found him. Only in case of death of the patient under his hands was the law applicable.

Denture construction is simply the carrying out of a series of details, all of which are not simply, but each absolutely essential to success. As far as the fee is concerned, I honestly think that it will take care of itself. Ability, plus self-confidence, makes a selling combination that is hard to beat. *Care should be taken not to sell more than you can deliver.*—John B. La Due, D.D.S., Chicago. Read the article, "Classification of Full-Denture Patients," in the November issue of THE SUMMARY.

This time a dentist, says it. And the good work goes merrily on.

I am a thorough believer in the prevention of pain during dental and other surgical operations, provided that beneficent object may be accomplished without risking the life of the patient. This provision makes me very skeptical concerning general anesthesia, no matter how induced. Early in life I was honored by the friendship of a man who had been dean of the faculty of a medical college for forty years. Much older than I, he was regarded by me as the highest type of man, even before I knew just what that meant in its entirety. Speaking of operations under anesthesia as then practiced—chloroform, ether, or a combination of the two—this man said to me: "Why, Harter, when we put a man under, he's dead; dead as he ever can be. If we bring him around again, that's another matter; that has nothing to do with the fact that, for the time being, he's as dead as Lazarus." Adding: "And sometimes we don't bring them around." That's the point; and sometimes they stay "under." From a letter just received from the editor of a medical magazine I quote: "The medical profession is always open to anything new that has merit in the line of medication and this is palpably true along the special line of anesthetics; signally so in the case of local anesthesia. The trend of thought and purpose is away from general narcosis, with its dangers, hazards, and its numerous other undesirable features." This certainly is good news, particularly in view of the fact that advances made in local anesthesia during the past ten years or so, leave little or nothing to be desired.

Readers of THE DENTAL SUMMARY should know that the publishers of that magazine have established a Service Department, with men in charge whose duty it is to answer professional, technical and general questions, investigate complaints and remove their cause, and, in general, look after the interests of any who care to write, entirely without charge of any kind or degree. You are invited to make use of this department for research, investigation, practical suggestions, or in any way that seems good to you, particularly concerning the goods bearing the R. & R. trade-mark. Complaints are particularly invited.

What a wonderfully pleasing thing it would be if every subscriber would send in a new name along with his renewal? And what added influence for good such an increase would give your magazine! I think THE DENTAL SUMMARY is well worth such support from every reader. There is one danger, however; I might fall dead from surprise. However, I am willing to risk it. In sending in your renewal it is not necessary to send remittance with it if not convenient. Just let us know that you want THE SUMMARY continued. Bill may be sent later if you like.

Fines of five to fifty dollars assessed by courts against "dentists" who insist upon "practicing" without a license are not likely to put a stop to the evil. We found that out in the bad old saloon days. Fine such men $500, or, better, give them a few hours or a few days in the common jail, and see that a full account of the matter be published in the local newspapers. In such accounts it will be well to inform the public just how little prepared the culprit is to give genuine dental service. Stamp it out.

A woman shoots a dentist to death in a "lover's quarrel;" then brings suit against a life insurance company for the amount of his policy! Some world, brethren; some world! Of course, she was his wife.

In the meantime—get your renewal in early. You don't want to miss a single number.

Bronx County Dental Society asks an appropriation of $25,000 for clinic at Fordham Hospital. Here's hoping they get it.

If you don't see what you want, ask for it. Much good dental work is being delayed to the detriment of the public because of that fault of human nature which leads most of us to suppose that what is not offered cannot be had. One county in West Virginia voluntarily taxed itself to establish and support dental clinics in the public schools. One good man, in deadly earnest, can get nearly anything that he has the nerve to ask for.

The aid of the dental profession is necessary if proper care is to be taken of the men in the army, and preparations are to be made in anticipation of another national crisis, Major Gen. M. W. Ireland, Surgeon-General of the army, told delegates to the convention of Military Dental Surgeons at Milwaukee. General Ireland urged all members of the profession to support plans for training dentists in civil life in the work necessary in the army.

"We expect to have established by next January a training school at Washington and corps schools at various other points, to give the necessary training to about 800 dental officers a year," he said. "The officers will be trained in the rudiments of military art, and the school at Washington will provide special professional instruction on subjects peculiar to the army.

"In this way we hope to build up an organization that will be large enough to take care of the dental work in an army of 4,000,000 men."

Editor News and Opinions,
THE DENTAL SUMMARY:

Dear Sir:—I have just read the first item in August SUMMARY. On reading it the thought occurred to me: That is the stuff, but it is not strong enough. It should be made so strong that at least a little of the petty dishonesty that helps to make life a burden would be stamped out.

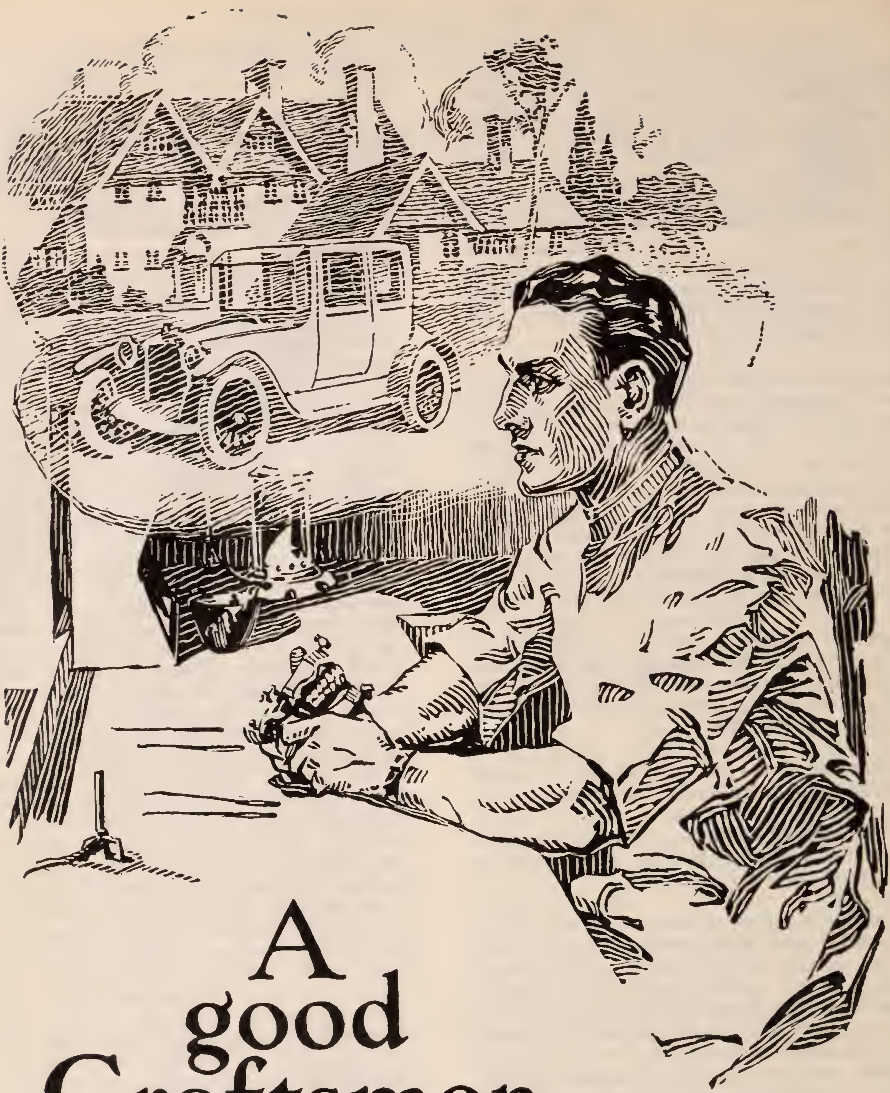
I, and possibly some other dentists, wish something of the kind could be made strong enough to cause some of the dental supply houses to stop keeping our money when we remit with order and happen to send too much money. They keep what does not belong to them, and write us: "We have placed the amount to your credit," even though we do not owe them anything The (I am afraid to mention names) Company served me in that way just this week. At one time, many years ago—I have not dealt with that house since—I had to draw on The (I am afraid to mention names) Company for money that, because they would not send the goods on approval. I had sent to them for goods that they said they had on hand and would ship immediately on receipt of the price. When the money reached them they wrote that the goods had been sold, and that they had "placed the amount to my credit." I did not owe them anything, I do not owe them anything now, nor is it my intention ever to buy anything from them again.

Some of the dealings of the supply houses are so unpleasant that I, for one, and I have no doubt that there are others, would be glad to find "jobs" paying a living wage, so as to be relieved of the need to do business with them.

If we dentists can find a dental supply firm that will return at once all that is due us, and treat us right otherwise, I would be in favor of boycotting the concerns that try to keep our money, and do not treat us right otherwise.

Yours for Honesty,
S. E. W.

Will dentists who have had similar experiences please send reports of the facts to me? Large mail-order concerns learned many years ago the "We have placed the amount to your credit" makes a lot of bad friends, and I had supposed that it had been generally discontinued long ago. While of course not intentionally dishonest, and while the amounts so retained cannot be very large, the custom is an annoying one that should be replaced by the modern method of immediately returning all such amounts in full. Where there are running accounts, or frequent purchases the case is entirely different, of course. No money ever should be retained without the full knowledge and consent of the sender.



A good Craftsman –

but, is that enough?

WHAT has your skill brought you?

Have you been able to transmute it into a satisfying materialization of your dream?

Has it brought appreciative patients, financial independence, a tranquil mind and the creature comforts for those dependent upon you?

If you are not satisfied—if you feel that the proper measure of success has not attended your efforts, it might be well to look into the cause and then consider, seriously, a possible solution. Thousands of dentists are now achieving results that seemed impossible a few years ago.

Trubyte

—the Teeth that supplement your Skill

If you possess average skill and will determine what it costs you to construct dentures, you will find your problem answered in part. However, the use of Trubyte teeth will enable you to ***reveal*** your skill so convincingly that mutual confidence and increased fees result.

Good Craftmanship is essential, but it alone is not enough.

Poor materials impose limitations on everyone who uses them, regardless of the degree of skill possessed.

Fine materials and perfect tools liberate imagination and skill and the artisan sees his highest conceptions materialize.

Trubyte teeth beckon the earnest and skillful worker on to ever-widening fields of achievement.

RESTORATIONS T THAT RESTORE

Your Dealer or Direct

The **DENTISTS' SUPPLY COMPANY**

220 West 42nd Street New York City

All readers will agree with me that this department has been kept entirely free from all advertising features during the many years that it has been under my control. Sometimes I think that I might have served my friends better by telling them some of the things that I know concerning certain dental medicaments and other materials. I should, for instance, be glad to talk about a certain local anesthetic; and also about a pyorrhea treatment that I know a great deal about. Anybody want this information? Say so, and I'll gladly give it.

Every dentist who uses gasoline these days will be greatly interested in knowing that a device has been perfected and is now offered that will burn the rottenest gasoline on the market as well as the highest grade with complete satisfaction to the user. The flame is instantly adjustable for all kinds of laboratory heating, in size, shape and intensity as may be desired. I shall be glad to tell you all I know about this appliance. A card addressed to me will have immediate attention.

I have been trying for quite some time to formulate a definition for the word "aristocrat" that suits me, and have at last succeeded, I think. To my mind an aristocrat is one who does everything he can do for himself, does all that he can for others, and accepts no service from others that he cannot fully repay. If to this we add a kindly consideration for the rights and feelings of others, we will have a pretty good definition for the word "gentleman," it seems to me. What do you think?

Warren, N. Y., has established a school clinic at public expense. Read Dr. Epling's report of school activities down in West Virginia; then get busy. There is an example very well worth emulating.

Arrangements are under way which will give The Dental Summary an exclusive X-ray Department during 1922, under the able management of Dr. William A. Lurie, of New Orleans, La. Those of you who have read Dr. Lurie's papers in August, September and this number, must have recognized the patent fact that he is a "digger," an able writer, and one amply able to fill space devoted to his specialty in a most acceptable manner. Complete announcement will appear later.

Please allow me to urge all subscribers to get renewals to us as early as possible. During the busy season we are greatly rushed, mistakes are likely, and there may be delay. The cost to you is the same in any case, while early renewals are certainly a great convenience to us.

Cincinnati is said to be infested with illegal and incompetent "dentists." Several arrests have been made.

The Knights of Columbus have donated a half-ton of dentifrice to the military and marine hospitals in which they are interested.

You should buy only one

Dental X-Ray Outfit

in a lifetime and before doing so

SEE

EDWARDS Coolidge Dental X-Ray Unit.
EDWARDS Mobile Tube Holder (at your finger tips.
EDWARDS Gravity Time Switch.
EDWARDS Auto Control.
EDWARDS Angle Indicator.
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EAGLE MIKADO
EAGLE PENCIL COMPANY, NEW YORK

How the Harvard Company is Enabled to Reduce Prices Again

There are three necessary parties to the dental business: Dentist, Retail Dealer, Manufacturer.

The dentist wants the best goods at lowest price consistent with quality.

The dealer must gather and buy from a hundred or more manufacturers, stock thousands of articles dentists must have, must employ a large sales force, proficient in calling upon and selling to the trade, and another sales force to sell over the counter, then expert packers and shippers, next a force of accountants, for all of which he must have a fair profit. The most successful dealer is the one employing the most up-to-date efficiency.

The manufacturer's business is to make goods and wholesale them to the dealer, and he also should employ the highest efficiency known to factory work.

The Harvard Company buys only the best material for the purpose in large quantities, pays spot cash to get the lowest price, employs the best mechanics, working with special machines and tools which enables every workman to do his best in producing quality and quantity without hampering restrictions. The Harvard Company makes its products up to the highest state of utility, endurance, richness, and beauty in design. easy and convenient of operating, simplicity of mechanism, comfort and pleasing to patients to the end that the dentist shall WANT Harvard products and the dealer shall BE GLAD to buy them at wholesale for retail to the dentist.

The dentist can best practice this efficiency rule by buying from the dental depot or its salesmen in whom he has confidence. who will give every opportunity for examining and selecting for himself, to the end that a valued customer shall be satisfied.

If the manufacturer *must send out Salesmen* to assist the retail salesman, and the dentist waits to be sold to, rather than to buy, a new element of sales expense is introduced which must be added to the dentist's bill.

If the dealer buys by mail direct to the manufacturer, he practices efficiency. If the dealer waits for the manufacturer to send salesmen at large expense of salaries, railroad and hotel fares, to dig the order up, efficiency is abandoned and the dentist eventually foots the bill.

The Harvard Company best serves both dentist and dealer by specializing in manufacturing along the most efficient lines, which means economic lines and which enables leadership in reduction of prices by offering the highest class product at prices not elsewhere obtainable.

The Harvard Company has reduced prices ranging from $45.00 to $65.00 per chair, according to style and finish; a corresponding reduction in the prices of cabinets and is now putting on the market a dental engine unsurpassed in quality of material, workmanship, efficiency, durability or ornamental design at a price much lower than elsewhere prevailing. Write for catalog showing prices, terms, etc.

THE HARVARD COMPANY,
CANTON, OHIO.

Dr. Henry L. Banzhaf, Milwaukee. advocates the establishment of cooperative dental clinics as a means of providing honest dentistry for workingmen and others who can afford to pay only moderate fees. His idea is that each dentist in attendance should practice only his own particular specialty—or the sort of dentistry that he can do best, thus reducing the necessary time, and increasing his efficiency 40%. Each dentist would devote only a limited amount of time to such work. The clinic to be centrally located, and, probably, only one man devote his full time, making examinations, etc. The idea looks fine to me. I wonder who will work it out and systematize it? It should be done.

It is estimated that 40% of school absenteeism is caused by bad teeth. Then 40% of the additional cost of educating absentee pupils is chargeable to the lack of proper dental care. Just a fact that you can use in your local campaign.

HANAU ARTICULATOR
(Patent Pending)

Fully adjustable to comply with the most exacting anatomical requirements.

Indispensable for correctly setting up and grinding-in artificial dentures.

PRICE $50.00

Hanau Articulator equipment for laboratories $115

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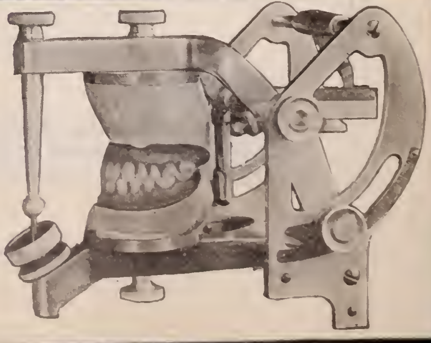

The Zero Hou

THE wish of every dentist who loves his profession is about to be realized.

A thoroughly practical plan has been devised for the ethical dental education of the public.

The campaign is national in scope, but dentists are not asked to contribute to the dental education of those whom they do not know stand in need of it.

A series of twelve messages as to what dentistry stands for has been written and will be mailed monthly direct to the homes of millions of our fellow citizens.

DENTAL WELF

Pittsburg

(This space donated by Williams Gold Refining Co. for the use of The Dental Welfare Foundation in its campaign for the ethical dental education of the public.)

Has Arrived!

The words "and family" will be added to every address to whom dentists wish these messages mailed.

This will insure an average of five readers for each card printed.

On October 1st a booklet entitled "Dental Education of the Public" was delivered to the office of every dentist in the United States and Canada.

It explains the plan in detail and shows how this wonderful thing may be accomplished and yet have the burden of expense so widely distributed that it will not be felt by any individual.

Read that booklet.

It will give you a genuine thrill.

E FOUNDATION

S. A.

(This space donated by Williams Gold Refining Co. for the use of The Dental Welfare Foundation in its campaign for the ethical dental education of the public.)

WATCH YOUR TEETH

DWF

DEATHS

At Schenectady, N. Y., September 11, Dr. Herbert D. Waldo, aged 65.

At Douglaston Park, N. Y., August 28, Dr. William Curtis Deane, aged 66 Dr. Deane had been a member of the N. Y. board of examiners for fourteen years.

At Buffalo, N. Y., September 1, Dr. H. J. Stocking, of Westfield, Pa., aged 62.

At Boise, Idaho, September 1, Dr. Edward Hugh Maberly, aged 69.

At Porterville, Calif., August 11, Dr. B. L. Carpenter, late President of the California state dental association, aged about 60.

At Bakersfield, Ill., August 17, Dr. Edward Robert Victor, aged about 60.

At Milwaukee, Wis., while in attendance upon the National dental association, Dr. J. F. Burkett, of Kingman, Kans. He was president of the Examining Board in his state.

At Mexico City, July 24, the result of burns caused by an explosion of gasoline, Dr. W. W. Condries, formerly of Salem, Oregon.

At Minneapolis, Minn., August 12, Dr. Josiah Hartzell, aged 51.

At Sacramento, Calif., August 16, Dr. Clifford G. Barrett, aged 64.

Dr. Friesell said in his presidential address at Milwaukee that the country is suffering from a shortage of fifteen hundred dentists, and that nothing is being done to remedy this condition. He continued:

"In one state, there are 13 counties which have only two dentists each. In another state, there are 24 counties with only one dentist each, and in still another state, there are 14 counties where there are no dentists at all!

"How has this situation arisen? By the raising of educational requirements to a point where the number of students is insufficient. Not only has the length of time that students must spend in scientific training been increased, but the general educational requirements have been stretched to an unnecessary point.

"Since the lack of dentists leads to neglect of teeth and the consequent spread of disease, it amounts to a national menace to health, and we must set about remedying it. I believe we should see that the length of time required for scientific training is not further increased, and that the preliminary educational requirements be made less restricting."

Ohio—Jackson County

The Jackson County Dental Society held its annual meeting at Jackson, Ohio, Friday evening, September 2nd. J. O. Hawkins was re-elected president and C. E. Ervin was re-elected treasurer-secretary. After supper the members very profitably discussed questions pertaining to the dental profession. This society is doing all it can to educate the public to take care of the natural teeth.

—J. O. H.

A National Committee on Nomenclature

The Board of Trustees of the National Dental Association approved a resolution presented by the Dental Editors' Club relative to the appointment by the National Dental Association of a Committee on Nomenclature. The Board of Trustees not only approved the resolution but referred the matter to the House of Delegates and recommended the approval of the resolution and the appointment of a committee. This resolution was passed by the House of Delegates and the following committee appointed:

L. P. Anthony, chairman, Philadelphia, Pa.; C. N. Johnson, vice-chairman, Chicago, Ill.; Otto U. King, secretary, Chicago, Ill.; H. E. Friesell, Pittsburgh, Pa.; Herbert L. Wheeler, New York, N. Y.

At the Meeting of the Dental Editors' Club the following officers were elected for the ensuing year:

Otto U. King, chairman, Chicago, Ill.; L. P. Anthony, secretary, Philadelphia, Pa.

Testimonial Dinner for Dr. J. P. Carmichael

At the recent meeting of the National Dental Association at Milwaukee, a testimonial dinner was given Dr. J. P. Carmichael by visiting dentists who had taken his post-graduate work in Oral Prophylaxis and Inlays. A number of Pyorrhea specialists from various cities attended. The occasion afforded a most interesting discussion of pyorrhea treatment.

Classified Advertisements under this heading, $2.00 each for 60 words or less; additional space, 2 cents per word, single insertion; three insertions or more special rate on application.

FOR SALE—Dental Practice in good section of Ohio City of 10,000 population. Excellent reason for selling. Address: W-1020-C care of Dental Summary.

FOR SALE—Modern Dental Office in Ft. Wayne. Good equipment. Excellent location which yields good fees. Address: XY care of Ft. Wayne Dental Depot, Ft. Wayne, Indiana. 1010-P

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MATERIALLY AIDS
Local Treatment in
PYORRHEA
Bristol-Myers Co.
New York

REGULAR CONTRIBUTIONS

THE DENTAL SUMMARY
THE MAGAZINE THAT HELPS

Vol. XLI November, 1921 No. 11

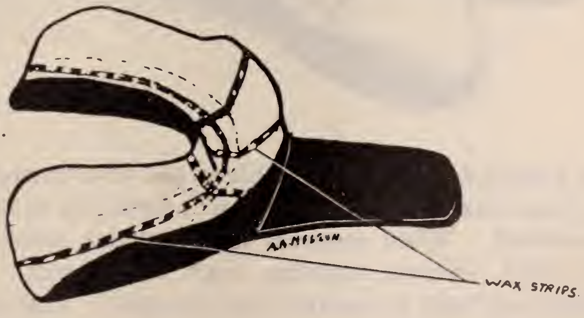
IMPRESSIONS FOR PARTIAL DENTURES*

BY A. ALFRED NELSON, D.D.S., DETROIT, MICH

PARTIAL DENTURES, AS STATED in a previous article, are only as efficient in direct ratio as the cast over which they are made is perfect.

Much discussion has taken place in recent years as to the relative merits of compound and plaster of Paris for partial impressions and these discussions have been very helpful to the student of the subject for the reason that they have brought out features that have for long remained clouded.

From a teachable and practical standpoint it is apparent that neither material used will alone give the desired results in the finished piece. Remember, I stated from a teachable standpoint. There are exceptions to all rules. Truth and a better finished satisfactory product to offer mankind is the ultimate aim to be reached in any line of endeavor. That is the true meaning of progress whether it be in the manufacture of can-openers or partial dentures. And when I say teachable I mean from the standpoint of giving the student a clear conception of the results we are trying to obtain and the shortest route possible to obtain this desired result with the least amount of waste effort.



Impressions, then, are of prime consideration in the securing this ultimate result—a masticatory, functioning mechanism.

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*The sixth of a series of articles on Partial Denture Construction being written exclusively for THE DENTAL SUMMARY.

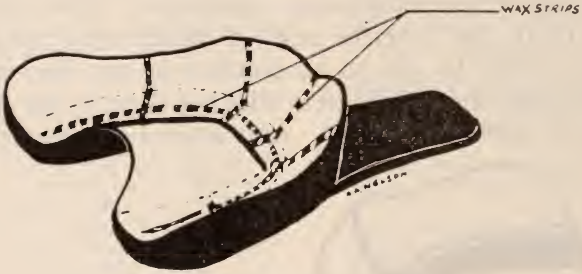
Partial impression technics should be divided into two classes:

First. Those cases requiring either palatal or lingual bars.

Second. Those requiring no lingual or palatal bars.

For those of the second class a systematized sectional compound or plaster technic is advocated. Mr. Samuel Supplee, of New York, has developed a very definite sectional compound technic which is admirably suited to cases of class *two*. However, class *one* cases are the rule in practice rather than the exception, so for this reason we will consider a teachable, practical technic for these cases.

Assuming that clasps are to be used as the retaining device and that they have already been constructed and finished, they are placed in the mouth on their respective teeth. Preparation should now be made to take a plaster impression. Complaster or R. & R. soluble impression plaster can be used with equal success. Select a tray, suitable for the case. Cut strips of base-plate wax about an eighth of an inch wide and after careful study of the study models, the lines of fracture desired can be determined approximately in the tray. Place the wax strips in the tray where you want the fracture to come and lute them with a little hot sticky wax. Then coat the wax strips and tray with K-Y lubricating jelly or vaselin. Mix plaster to desired consistency and make impression. When set, the tray is readily removed, having been lubricated and the wax strips pulled out of the impression material. It will be seen that these thin strips have left a deep narrow depression in the impression material. By taking a blunt-end instrument and wedging into these depressions, the impression will come out in sections that are easily assembled. When removal is completed, allow it to dry, assemble, and stick sections together with sticky wax. Coat with isolating solution and pour in desired cast material. This is the initial or basic impression from which the basic cast is made. Upon this cast the metal work, such as lingual or palatal bars, attachments, etc., are to be constructed, fitted and assembled, and upon this the case is to be carried to ordinary completion.



The reason this basic impression was taken in plaster of Paris was to secure an accurate detailed impression of the movable and immovable tissues of the mouth in their relation to one another in a rest condition, without the attendant distortion that necessarily follows when stress is applied in taking an impression with compound or compound and plaster. This is for the purpose of proper placement of the attachments and lingual or palatal bars to their respective tissues.

Preparation is made for establishing central occlusion and mounting on an articulator. When this detail has been accomplished the case is carried to completion in the usual manner and vulcanized. But provision must be made in the finished product for a freeway for the use of compound so that the saddle may be taken under stress of mastication. When polished, the saddles are rebased, using compound.

The case having been constructed over a cast made from a plaster impression precludes the possibility of equalizing the stress of mastication upon those tissues with the saddles. In other words the resiliency of the soft tissues is not interfered with in the act of taking an impression with plaster of Paris. All partials must have an equalized bearing upon their foundation when the stress of mastication is placed upon them in the position of central occlusion, the same as in full dentures.

We do not want the mucosa underlying the lingual or palatal bars under stress of mastication, because of the limited area they cover; they would produce pathological changes in the tissue due to strangulation, if in too close proximity to same. We merely want them touching the tissue during this stress.

Since the saddles must carry the burden of work, it is necessary to secure an impression of the ridge carrying the saddles under stress of mastication. This can best be done with compound as it allows for corrections and muscular and tissue trimming.

Then and only then, do the saddles function as intended for the transmission of stress of mastication to mucosa and underlying structures, without strain upon abutment teeth.

213 Chalmers Bldg.

BILATERAL ANKYLOSIS OF MANDIBLE

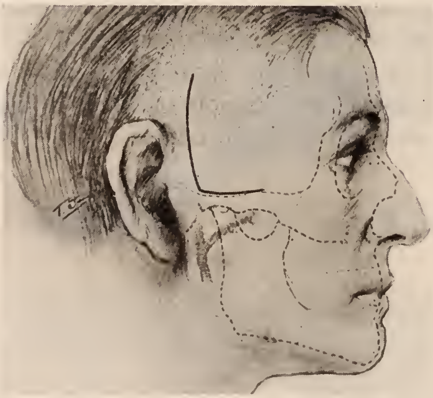
BY E. P. CARTY, D.D.S., SCRANTON, PA.
DENTAL AND ORAL SURGEON TO STATE HOSPITAL, SCRANTON, PA.

(Written for the DENTAL SUMMARY)

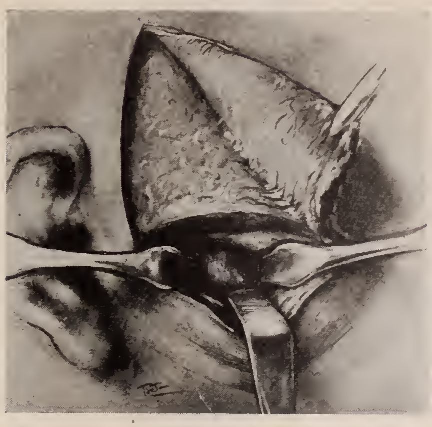
A PATIENT WAS ADMITTED INTO the hospital for treatment for rheumatism, sometime in 1917. Having several upper and lower teeth loosened by pyorrhea alveolaris, they were removed. At that time the mandible was ankylosed more on the left than right side. The condition improved and the patient was discharged in a few days.

In June, 1921, the patient returned to the hospital to see if the ankylosed state of the jaw could be remedied. Upon examination it was found that chronic rheumatoid arthritis had produced the affection. The mandible was completely closed and the patient had been unable to open the jaw for seven years or more. The patient was placed under an anesthetic and I found it impossible to break up the osseous structure by the aid of a mouth-gag or wedge.

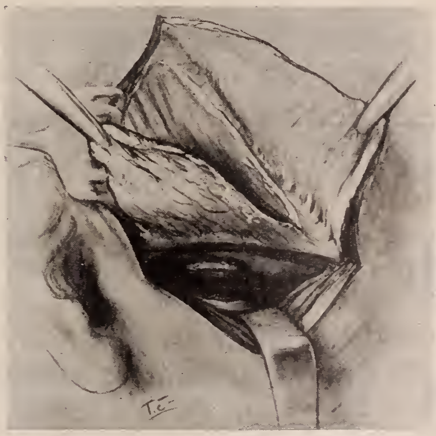
We, Dr. C. B. Noecker, Visit Surgeon to State Hospital of Scranton, and myself, decided to perform "Murphy's Operation," which is as follows:



The L-shaped skin incision above the zygoma and in front of the ear, is so placed to avoid injury to the facial nerve. Note the relation of the external carotid, the temporal and internal maxillary arteries to the field of operation. The last named vessel in passing inward behind the neck of the mandible lies close to the bone and must be carefully protected from injury during the operation, especially at the time when the mandible is divided.



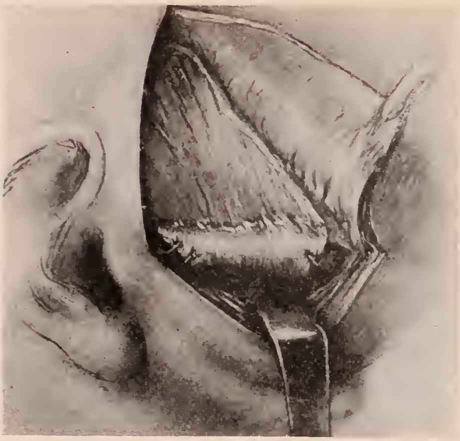
The skin-flap is retracted and zygoma and neck of the mandible exposed. The two curved periosteal elevators are shown closely applied to the posterior surface of the neck of the mandible, thus protecting the internal maxillary artery from injury to the division of the bone.



The pedicled fascia and fat flap are dissected out from the temporal fascia, and the free end of the flap is turned inward between the divided ends of the mandible and sutured securely in place with tacking stitches.

The flap is now in place and the wound ready for closure.

The incision was closed, sewed with horse-hair sutures and sterilized dressings were applied. In two weeks the patient had no discomfort and the jaw could be opened to the extent of one and a-half inches and



used naturally. In a short time an artificial denture will be inserted. There has been no signs of paralysis or any other disturbance since the operation performed two months previous.

One hears frequently of the single ankylosis but the double ankylosis cases are very rare.

Smile awhile,
And while
You smile another smiles
And soon there's miles
And miles of smiles
And life's worth while
Because you smile.

PREVENTIVE DENTISTRY: FROM A SLIGHTLY DIFFERENT POINT OF VIEW*

BY H. E. FRIESELL, B.S., D.D.S., LL.D., PITTSBURGH, PA.

THE QUESTION OF ORAL FOCI of infection and their influence in causing systemic disease has not only given the dental profession much concern but has vastly increased the demand for dentists until we find ourselves confronted with the apparent hopelessness of restorative dentistry, from the quantative standpoint alone. These conditions compel us to make a careful study of the possibilities of preventive dentistry which is no new subject, but unfortunately much of the ordinary dental practice which is preventive in character, has not been fully appreciated. The purpose of this paper is to indicate to some extent what real dentistry (not pseudo dentistry) offers for the solution of the problems of focal infection and the control in its inception of the enormous amount of dental disease with which we are confronted.

After many years of seemingly vain pleading for recognition of the importance of the mouth in its relation to the general health, dentistry—the Cinderella of the professions—has recently come into its own. The acclaim with which our profession finally has been welcomed into the Royal Family of the Healing Art has been at times actually embarrassing. To step almost suddenly from the scullery where one's labors have been considered menial, to the brightest place in the sun, and have one's efforts and advice eagerly sought as essential and conclusive after all others have failed, is a startling transition and necessarily more or less disturbing to one's equilibrium.

From a place that was considered, from the viewpoint of health, as only a convenient opening by which food might be introduced into one's interior, the mouth has come to be recognized as the gateway by which ingress is had for the majority of the ills that flesh is heir too. It is known that the alimentary canal is about thirty feet long, and that the first four inches inside the lips is all over which the individual exercises control; but only recently has it come to be recognized that the intelligent control of that first four inches will eliminate practically all the troubles and difficulties of the remaining thirty feet.

The study of the pathology of many systemic diseases has disclosed their causes frequently to lie in areas of infection remote from the apparent seat of the disorder. These areas of infection have been traced to the oral cavity with sufficient frequency to produce a veritable revolution in the interrelations of the medical and dental professions, shocking the former into a realization of the dangers of a neglected mouth, and the significance of intelligent and conscientious dentistry;

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*Read before the Tennessee State Dental Association, Nashville, May, 1921.

and the latter into a recognition of the value of an intimate knowledge of oral pathology and its paramount importance in conjunction with every operative procedure that is carried out in the mouth.

Like many new ideas in the Healing Art, this one frequently has been carried to extremes; the shallow thinking or hysterical minded members of the medical profession demanding the most drastic measures, and the unscrupulous members of our own playing on the fears of patients and physicians unconscionably.

Recognition of the importance of the mouth as a possible source of serious systemic disturbance has created an unprecedented demand for good dentistry; in fact this demand has increased in recent years until the profession is no longer able to meet the calls made upon it, and our schools must turn out twice the number of graduates they are now doing before any hope of successfully combating the situation can be looked for.

Diseases of the dental tissues begin so early in life and are so nearly universal in their frequency that thoughtful practitioners have despaired of ever keeping up with the problem of repair and restoration, and are turning their thoughts so consistently to prevention, that we find ourselves standing upon the threshold of an era of preventive dentistry.

This term "*Preventive Dentistry*" is being heard with increasing frequency in our dental meetings and is appearing more prominently in dental literature of late, which is a good indication of the trend of modern dentistry.

Now just what is meant by the term "Preventive Dentistry"? What is it we may hope to prevent? What preventive measures give promise of success?

The important aspect of oral disease as it is considered today is the development in the mouth of infectious foci, the vitiating influence of which is manifested through serious lesions in distant and vital organs and tissues. These infections can be traced largely to two principal avenues of entrance to the vascular and lymphatic systems. These avenues are the pulp canals and the gingival border of the peridental membranes. The principal cause of exposure of the pulp canals is a disease called dental caries. A lesion of the free margin of the gum,—of the gingiva—is the practically universal precursor of disease beginning at the gingival border of the peridental membrane.

If dental caries can be prevented or controlled before pulps are exposed and abscesses developed; and if the investing tissues of the teeth, the gingiva and peridental membrane, can be maintained in good health, the two main avenues of systemic infection through the mouth will have been closed. If oral foci of infection can be prevented, one of the principal sources of systemic disorders will have been eliminated, and dentistry will have taken what a world-famed surgeon has called "the next great step in preventive medicine."

A brief study of dental caries is essential to the formulation of measures for its prevention, or at least its control before it has reached the danger point.

A careful study of the phenomena of dental caries will soon convince us that the cavities of decay that develop in the teeth are not mere accidents or the result of purely physical influences, but that they are symptoms of a disease which is distinguished by very definite points of beginning, periods of activity, manner of progress, etc. Once dental caries is recognized as a disease it is not impossible to prevent it in many cases; nor is it very difficult to check its progress or prevent its recurrence.

Caries is a disease that is practically universal in the human family. So prevalent is it that not more than 3% of mankind are immune. But this doesn't mean that the unfortunate 97% of us who have decayed teeth necessarily suffer from the disease at all times. On the contrary dental caries is manifestly a disease of childhood and adolescence; and those of us who have had intelligent care of our teeth between the ages of 4 and 20, rarely suffer from the disease thereafter, unless it be during prolonged periods of great vital depression or low resistance.

Neither are all portions of tooth surface equally susceptible to dental caries. A careful study of the beginnings of caries will show that certain portions of the teeth rarely, if ever, become the initial point of decay; while there are other places which are practically always the first to succumb.

For the sake of brevity some of the important features of the pathology of caries will be stated in axiomatic form. These are not arbitrary statments; they are based upon careful observations that may be readily verified. Decay does not begin upon tooth surfaces that are kept scoured by the food in vigorous mastication, unless there are defects in the enamel of those surfaces, such as pits and fissures which permit micro-organisms to penetrate to the dentin where the grinding action of the food cannot sweep the tooth structure clean.

Dental caries may be divided into three stages. The first stage presents itself by the development of cavities, in the pits and fissures (defects) that, as the result of incomplete enamel formation are found in the occlusal surfaces of molars and bicuspids; the buccal and lingual grooves and pits that sometimes occur in the occlusal portions of those surfaces and in the lingual pits of upper incisors.

This type of decay is the first to be seen in the mouths of young patients and is marked by the fact that the orifice of the cavity is always small, and the interior usually large. On account of the small orifice and the large, deep interior, this type of decay is spoken of as penetrating decay. The penetration is due to the fact that the decay has ready access to the dentin through the original enamel defect and a long time to progress without interruption. The orifice remains small because the micro-organisms are prevented by mastication from spreading on the surface and thus enlarging the opening.

This class of decay should be looked for early and the cavities should be promptly prepared and filled, no matter how small the orifice may appear. They should be filled with amalgam or copper amalgam if suitable cavity form is obtainable. The cavity need only be enlarged sufficiently to remove decayed dentin and undermined enamel. No extension of cavity outlines for prevention of recurrence of decay is necessary for this type of cavity because it only occurs on clean surfaces, and mastication will prevent recurrence, provided the filling work is properly done. In case it is not possible to fill properly with amalgam on account of the age or lack of cooperation of the patient, then such cavity preparation as is possible should be obtained and black copper cement used for filling, or in the most difficult cases, saturation of the cavity with silver nitrate will retard decay until age and developed confidence of the patient permits of more permanent work.

The second stage of caries is proximal decay. It always begins just to the gingival of the contact point, and spreads on the surface of the tooth only as the septal gingiva is forced back and unscoured tooth surface is exposed. Its penetration through the enamel is slow, as the enamel at this point is seldom defective; therefore this type of decay is spreading rather than penetrating. Cavities of this class are usually several years later in manifesting themselves than are the pit and fissure cavities. Once the dentin is reached, however, the contact point is readily undermined and broken away by lateral pressure of the teeth; the interproximal space is lessened; the septal gingiva recedes, debris collects in the pockets that are formed, gingivitis occurs and fequently chronic suppurative pericementitis (pyorrhea) results.

Careful observation of the septal gingiva is essential to enable early detection of any disturbance that might cause it to recede and expose the vulnerable area of tooth surface just to the gingival of the contact point. Early discovery of proximal decay, proper separation of the teeth, and placement of correctly-contoured fillings that restore the size and form of the interproximal space as well as the contour of tooth surface, is necessary. The contact point must be placed where it will protect the crest of the septal gingiva, and harmony of tooth contour with the contour of the gingiva must be obtained if permanent proximal operations are to result.

The third stage of caries is gingival third decay which attacks the buccal surfaces of the molars and the labial surfaces of the upper incisors and cuspids, but very rarely the lingual surfaces of the teeth. Many patients never suffer from this type of cavity, and when it does occur it usually comes late in the adolescent or early adult period. The cavities begin near the gum about midway mesio-distally of the gingival third of the tooth. For a long period they pass as superficial decay, which spreads over this area until it reaches a point at the mesial, distal, or occlusal, where the scouring action of the food limits its spread. It always stops at the gum line if the gingiva be healthy. After a considerable lapse of time the enamel is penetrated and the dentin reached. This type of decay is called spreading decay. It penetrates slowly because the enamel is perfect and presents no defects to permit rapid penetration. It spreads over a large surface because the surface is unclean, and mastication does not scour off the colonies of microorganisms.

By maintaining the teeth in good condition, so as to permit vigorous mastication, and by training the patient in the intelligent use of the tooth-brush, gingival third cavities may be prevented very largely.

In most mouths there is an appreciable period of time between the various stages of caries, and careful, regular observations begun early and perserved in, and supplemented by conscientious, scientific dentistry, will prevent the beginning of much decay, and control in their incipiency such cavities as may develop, thus permanently protecting the invaded surfaces so that the pulp does not become endangered or exposed, alveolar abscesses cannot develop, and one avenue of systemic infection from the mouth is closed.

There is a fourth stage of caries called senile decay which begins in the cementum beyond the gingival line, but this is always preceded by such injuries to the gingiva, that the carious cavity is greatly exceeded in seriousness by the soft tissue lesions that have given rise to the gum recession necessary to permit the development of the cavity. It takes its name from the fact that it is frequently found in the mouths of elderly patients.

A knowledge of tooth anatomy; of the areas where the several classes of cavities invariably begin; of the areas that are scoured clean by mastication and thus protected from decay; of the position of the gum line and the inhibitory action of the gingiva upon decay, and the conscientious application of this knowledge in our operations will do much toward preventing decay and toward checking it, once it has begun.

The second and most frequent portal of entry of infection into the blood stream through the mouth is undoubtedly through the gingival border of the peridental membrane, and inasmuch as the usefulness and preservation of the tooth also depend upon the maintenance of a healthy peridental membrane, the prevention of disease in this organ assumes paramount importance.

Nature makes provision for this protection by means of a special arrangement of the gum tissues to a portion of which we give the term gingiva, or gingivæ. The present definition of the gingiva is that portion of the gum tissue which lies to the occlusal of the crest of the alveolar process, surrounds the neck of the tooth, fills the septal space, and overlaps the gingival area of the crown of the tooth in such manner as to protect from decay much of the enamel surface that is not kept scoured and polished by the food during mastication.

The peridental membrane once exposed to the secretions of the mouth and to direct access by the bacteria thereof, readily becomes infected, which infection is practically hopeless of cure, and extremely difficult of control.

The gingiva, however, is composed of gum tissue and covered by mucous membrane, and possesses most remarkable powers of recuperation and of resisting infection. So long as the gingiva remains in a normal healthy state it affords perfect protection to the peridental membranes against infection or disease beginning at the gingival border, and since that point is the most vulnerable and most frequent focus of infection in the mouth it becomes our first duty to maintain the gingiva in sound health.

While the gingiva is so highly resistant to injury and infection, it should also be recognized that it is subjected to unusual exposure to injury in mastication, owing to its position in the mouth.

Under normal conditions the form of the crown of the tooth, as a result of its various contours, and especially the height of contour on the axial surfaces, is such that during mastication the food passes from the tooth surface and strikes the gingiva at a tangent, passing over its surface and affording it normal use and stimulation. But if there be any deviation from the desirable contour of the tooth whether it be due to wear, decay, unskilled restoration or other cause, which results in directing the food against the gingiva in such manner as to produce repeated injury, inflammation and infection must eventually result notwithstanding the remarkable vitality and resisting powers of this tissue. So close is the connection between the gingiva and the peridental membrane that serious injury to the former ultimately results in disease of the latter tissue with the serious sequellæ familiar to all.

Interference of any kind with the attachment of the gingiva to the peridental membrane at the gingival line results in a relaxation of the fibers that hold the gingiva snugly against the gingival margin of enamel, enlarges the sub-gingival space, permits the collection and disintegration of food in the space with consequent exposure of gingiva and peridental membrane to infection therefrom, and permits an extension of the gingiva beyond the contour lines of the tissue, which normally harmonize with those of the tooth crown, and in this way also makes possible impingement of the food upon the gingiva with the results already stated.

A more careful study of tooth form with special reference to the gingival line and the height of contour, as well as the contact point, the form and position of the gingiva, *and a recognition of the importance of a harmonious inter-relationship between the contour lines of tooth surface and gingiva*, will accomplish great good in preventive dentistry and the control of oral focal infection.

Let us make a brief review of tooth form in general. Lying upon the body of the mandible and maxillary bones we have a lighter frame-work or scaffolding of bone called the alveolar process, which surrounds and supports the greater portion of the roots of the teeth; the tooth roots being located in cavities in the process called alveoli. The alveoli do not surround the whole of the cementum-covered portion of the teeth, but only to a point about 2 to 4 millimeters from the cemento-enamel junction.

In naming the subdivisions of a tooth it seems appropriate to the essayist that they should be termed the crown, neck and root (or roots as the case may be). He would define the crown, as the enamel-covered portion of the tooth; the root as that portion of the tooth normally enclosed in the socket or alveolus; and the neck as that portion of the tooth lying between the crown and the root, or that portion of the cementum-covered part of the tooth not inclosed by the socket.

In general form the crowns of the anterior teeth, the incisors and cuspids are shaped like a wedge with rounded angles. The proximal surfaces are convex in both directions in the incisal half and flat or slightly concave in the gingival portion.

The posterior teeth, the bicuspids and molars are cuboidal in form with rounded edges.

The proximal surfaces of the bicuspids and molars are convex bucco-lingually and concavo-convex occluso-gingivally. Sometimes in the gingival third they are also concave bucco-lingually.

THE HEIGHT OF CONTOUR

The gingival extremity of the enamel or the junction of the enamel and cementum, is called the gingival line. If we pass from any point on the periphery of the occlusal surface to the gingival line in a direction parallel to the long axis of the tooth, we will establish a line which will be either convex in its entirety, or convex in the occlusal portion and concave as we approach the gingival line. The points of greatest convexity on lines of this type drawn at various portions of the surface will not be on the same horizontal plane, or equi-distant from the plane of the occlusal surface, but will vary in accordance with the general form of a particular tooth. If many of these lines be made on the axial surfaces of the tooth, running from occlusal surface to gingival line, the point of greatest convexity on each line marked, and these points connected with each other by a line circumscribing the tooth horizontally, that connecting line would indicate the *height of contour*. Or, if a tooth were placed upright upon a plane surface and numerous square edges were placed against it, the edge of each instrument would be a vertical line and would touch an axial surface of the tooth at a tangent. A line drawn through the points of contact of square edges with tooth surface would be the *line of vertical tangents*, or as the essayist prefers to term it, the *height of contour*. If a tooth were viewed from the occlusal, its lateral outline would be established by the height of contour; and the crest of the height of contour on the proximal surfaces would be indicated by the points of proximal contact.

IMPORTANCE OF THE HEIGHT OF CONTOUR

The height of contour marks the division between the clean and the unclean surfaces of the tooth. All tooth surface, (occlusal and axial), which lies to the occlusal of the height of contour is scoured by the food in mastication and is, therefore, a clean surface, upon which no extension for prevention is required. All tooth surface between the height of contour and the gum line is an unscoured, or unclean surface. Cavities of decay beginning upon such unclean areas will spread widely over the surface and extension of the cavity outlines will be required in order to prevent recurrence of decay around the margins of the filling.

The general form of the height of contour as it passes around the tooth, and is viewed from the occlusal, is concave on buccal and lingual surfaces, and convex on the mesial and distal. It approaches fairly close to the occlusal extremity of the gingiva on the buccal and lingual surfaces; and on the proximal surfaces it inclines towards the occlusal coming nearest to the latter surfaces at the contact points. The gum line very largely parallels the height of contour around the tooth, the two lines approaching each other very closely on the proximal surfaces, and separating more upon the buccal and lingual. Any pronounced variation from the normal in the form of a tooth surface will cause a considerable variation in the height of contour.

To show how the height of contour may vary upon a tooth surface in accord with a departure from the ordinary form of that surface a small marking device called a contouragraph has been made. The tooth is mounted horizontally between two rollers which will establish its long axis in relation to the direction of force as applied in mastication; superimposed, and parallel thereto is mounted another roller covering with a marking material. When the tooth is rotated against the marking roller, the highest points of each surface come consecutively in contact with it and indicate the height of contour by a line that is made by the colored roller.

Much stress has been laid upon the importance of the contact point, and it would be difficult to overestimate its importance; but the contact point is only a part of the height of contour, which latter has received entirely too scant attention in both dental literature and practice.

THE CONTACT POINT

The teeth of each jaw are arranged in the form of a semi-ellipse, the long axis being represented by the median line. On account of the form of the proximal surfaces, previously described, the teeth present convex surfaces at their widest mesio-distal diameters where they come in proximal contact, and as the proximal surface slopes away in all directions, (occlusal, gingival, buccal and lingual), from this place of contact we have a form of proximal contact, as Black has described it "such as would be made by the contact of two marbles, or at a single small point." The form of the proximal contact then, is a point such as one would find between two convex surfaces in touch with each other.

The surface of the tooth immediately around the contact point will be convex but seldom uniformly so in all directions. It may appear spherical in one aspect and elliptical or ovoid in others; but in any case the actual contact should be a point of contact, not a line or a surface of contact.

It should be remembered that the essayist is referring to the ideal, the desirable, the best form of contact, the type that we find most frequent among the best preserved dentures.

POSITION OF THE CONTACT POINT

The position of the contact point is equally as important as its form. It will not do to build up a convexity at any part of a proximal surface and because it necessarily comes first in touch with the approximating tooth, conclude that we have made a satisfactory contact point. The position of the contact point depends to a very great extent upon the form of the tooth, the form of each surface, its height of contour, the mesial and distal marginal ridges and the position of the tooth in the arch. To know where to place a contact point demands an intimate knowledge of tooth form. The best way to obtain that knowledge is by a careful study of Black's Dental Anatomy, (the most important work in dental literature) in conjunction with the study of extracted teeth, prepared skulls, and finally the teeth of each patient.

In the best form of denture, composed of bell-crowned teeth the contact points will be found to be in a line with the cutting edges of the incisors and cuspids, and slightly to the lingual of the buccal cusps of the bicuspids and molars. However, in thick-necked teeth and those of a more rounded contour, the contacts may be placed slightly more to the lingual. In some dentures where the second and third molars are small and more rounded than usual their contacts may be located midway bucco-lingually.

In the best-formed arches the contact points are near the occlusal surfaces, and only so far away from them as will result from the form and sloping of the marginal ridges. If the contact points be placed too close to the occlusal surface there will be a decrease in the amount of food that sweeps through the embrasures and a consequent lessening of the scouring or polishing of the exposed proximal enamel, with the result that caries will have a greater opportunity to attack those surfaces. If the contact be made too far toward the gingival, as will be the case if the marginal ridge is not reproduced, the tendency will be for food to wedge the teeth apart allowing it to impact upon the septal gingiva, something which *never* must be permitted. The septal gingiva fills the septal space in the form of an arch, with its convexity towards the occlusal, and the contact point should be placed where it will be just over the crest of the arch of the septal gingiva.

MARGINAL RIDGES

The mesial and distal marginal ridges are strong ridges of enamel which form the mesial and distal boundaries of the occlusal surfaces of bicuspids and molars, and the angle of junction of the occlusal surface with the mesial and distal surfaces. These ridges are crossed by a faint groove or fine line, indicating the line of junction with the lingual lobe of the tooth. They are rounded slightly towards the proximal surfaces, merging into the proximal convexity that extends to the height of contour.

THE INTERPROXIMAL SPACE

The teeth are considerably broader mesio-distally between their contact points than they are at the gingival line. This results in considerable spaces between them called interproximal spaces. The interproximal space extends from the crest of the alveolar process to the occlusal angles of the teeth, and is bounded bucco-lingually by the buccal and lingual planes of the teeth. It is subdivided into the buccal and lingual embrasures and the septal space. The septal space is normally filled by the septal gingiva. The width and form of the interproximal space are very important, because if the space is lessened by a dropping together of the teeth as a result of proximal decay, or by an improper contouring of the proximal restoration, the health of the gingiva will be imperiled, thus inviting further proximal decay and peridental injury.

The restoration of the proper form of the interproximal space is just as inportant as the restoration of the proper form of any tooth surface. A surface contact or a line contact bucco-lingually, will necessarily render the buccal and lingual embrasures more narrow and limit the amount of food passing through them with the results previously mentioned. Between the anterior teeth, on account of their arrangement in an arch, the labial embrasures are larger than the lingual, while between the posterior teeth the lingual embrasures are wider than the buccal due to the lesser size of the lingual lobes of the teeth.

SUMMARY

In order to practice preventive dentisty in accordance with the best information we have on the subject at the present time it is necessary for the dental profession to advocate and practice the following:

First. Early instruction in mouth hygiene for the purpose of limiting such types of decay as may be checked or prevented by brushing the teeth and cleansing the soft tissues, and in order to impress the young patient with the need for such attention to the mouth, as well as to accustom him to the feeling of a clean, healthy mouth.

Second. To make frequent and careful investigation of the areas of attack of the various stages of caries; and especially to discover and properly treat pit and fissure cavities and so far as possible to prevent the development of proximal and gingival third decay.

Third. To study the form, position, contour and condition of the gingiva and the inter-relation of the form and contour lines of the hard tissues with those of the gingivæ.

Fourth. To recognize immediately the slightest departure from the normal in the form or condition of the gingiva and promptly to remove the cause thereof.

Fifth. To appreciate the importance of the gingival tissues, to make them the subject of careful study and observation, and to recognize that it is just as important that tooth restorations be made to harmonize with the form and contour of the gingival tissues as it is to secure proper contour and adaptation to the cavity walls and surfaces.

Sixth. To perform all operations in the mouth in accordance with the best knowledge we have of the mechanical and pathological factors involved.

Seventh. To recognize that preventive dentistry means much more than the occasional cleaning of the teeth by the hygienist; that the protection of the hard and soft tissues of the mouth requires the highest type of skill and knowledge possessed by the dentist; that attention to the mouth must begin early, be continued regularly and be carried out thoroughly and intelligently, if success in prevention is to be obtained.

When we dentists realize that to concentrate our attention on the care of the teeth of the children, and to carry them through to maturity and middle age with healthy mouths and no pulp exposures or gingival lesions is a thousand times more important to the human race, than for us to establish a reputation for the highest skill in dental restorations; when we recognize that the prevention of dental disease and the maintenance of health as a result thereof is vastly more ennobling than the building of an enviable income through high priced adult dentistry to the neglect of the care of the children, the *soul of dentistry* will have awakened and our profession will receive and will merit the respect and the esteem of mankind.

SYMPOSIUM—GOLD INLAYS; INCLUDING CAVITY PREPARATION, WAX MODEL PATTERNS, INVESTING AND CASTING*

CAVITY PREPARATION**

BY ROBT. L. WHELESS, D.D.S., DALLAS, TEXAS

THE FIXED BRIDGE, IN SPITE OF the many varieties of removable bridges that have been brought forward recently and widely used, has its sphere of usefulness and has a place in everyday practice that cannot be usurped by other types. It is ideal in the case of small bridges and when constructed after the manner followed by Dr. Ted. W. Maves, is nothing short of ideal, as it leaves nothing to be desired in the way of strength, esthetic effect and the proper consideration of the dental pulp. Those who took the post-graduate course last year or who are to do so this year, and those who will make a study of the principles involved in this class of work are, or will be, greatly benefited and will be enabled to solve another of the many problems of dental science which confront us, and which by solving will enable us to make dentistry what it should be.

I believe you will agree with me that the question of abutments and the preparation of same is always of the greatest moment in bridge work. Of course there are many, many problems in bridge work which cause great concern but in the main, our anchorages must be correctly designed and carried out or else our work will fail no matter how well the rest of the work is made or how beautiful it is.

The preparation of the teeth for the abutments in this type of bridge work is greatly different from the ordinary run of cavity preparation and it is necessary to make quite a study of it before it can be accomplished with ease and the ''Basic Principles'' thoroughly mastered. I once heard a professor of anatomy say that the only way to learn anatomy was in the dissecting room. I believe that the only way to properly learn to prepare teeth for this type of work is to take a number of extracted teeth and prepare all the different typical preparations, not only once, but many times and of course, when it is attempted in the mouth it will even then be much more difficult. Last year our class spent most of the week on cavity preparation, preparing some six or seven cavities, including all the different types of attachments. This work is very particular and many mistakes will be made and a new start will have to be made again and again, but the reward will be great when the underlying principles are mastered. The principle rule to be observed in trimming down tooth structure is to "follow the anatomy of the tooth." This injunction will be heard by the members of this year's class on every turn.

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*Presented at Annual Convention of the Texas State Dental Society, Held at Dallas March 3 5, 1921. By Drs. Robert L. Wheless, E. L. Knox and Allen N. Kearby, Dallas, Texas; Members of Dr. Maves' Class of 1920.

**Part one of the symposium.

We will consider first the preparation for the full cast crown on a vital tooth. (*Fig. 1.*) Its application includes a small percentage of third molars, second molars and in some cases, lower first bicuspids. These teeth are more or less bell-shaped, and the lingual cusp being so short and ill defined as to afford practically no resistance, making it necessary to utilize the buccal suface, either entirely or in part for a frictional wall, to give resistance to torsion under which it is placed as a bridge abutment.

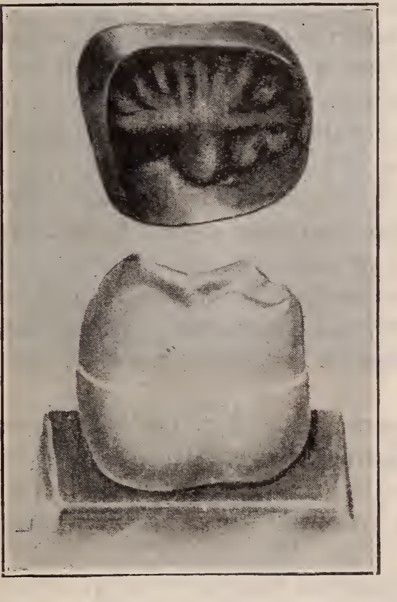

Fig. 1.

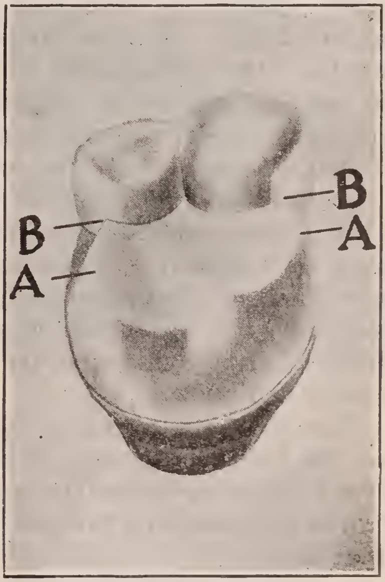

Fig. 2.

Fig. 1—Full Cast Crown and Preparation.
Fig. 2—Preparation for Three-quarter Crown.

The advantages of this crown over the banded type are mainly, continuity of crown with root surface, leaving no hidden recess to lodge debris, thus setting up an irritation of the soft tissues; in fact, prophylaxis can be carried on equally well after their insertion as before.

The enamel does not have to be scaled in its entirety from beneath the free margin, thus obviating the danger of injury to the peridental membrane, and, were it possible of accomplishment without this danger, the replacing of the crown in the same relation to the gingiva is a difficult procedure, to say nothing of the deleterious effect metal has when placed so far beneath the soft tissue.

The question of bulk for strength is well taken care of by the removal of the contour sufficient to allow the drawing of the wax crown and the placing of the gold cast duplicate.

A bell-shaped tooth never calls for a full preparation, there being sufficient length gingivo-occlusally to give resistance necessary without carrying margins bucally and lingually toward the gingiva farther than the height of the contour.

By following this technic, you reduce the thickness of the casting to the amount only needed in its construction to withstand the wear of occlusion and permit of reproduction of tooth form, and greatly minimize the danger to the pulp from thermal shock. The preparation of the sides of the tooth is accomplished with vulco-carbon discs and conical shaped carborundums, simply dressing away sufficient enamel and dentin, and in many cases only enamel, until the crown will draw from the line where you have previously determined the gingival margin shall be. This finishing line is then definitely outlined, preferably with the smallest cylindrical shaped carborundum. Its main reason for being there is to enable the operator to obtain a flush joint necessary to the finished product and the carrying on of future prophylaxis.

Coessential with the careful cutting of the sides, is the dressing down of the occlusal surface. This part of the operation should be accomplished with small carborundum stones of cylinder and inverted cone shapes, and, when completed should be merely a reduction in height of the cusps, occlusal planes and sulci from one millimeter in the sulci to one-half to two millimeters on the cusps, dependent upon the nature of the articulation.

This allows us to retain the maximum amount of tooth structure over the horns of the pulp, as well as adding from one-third to one-half of the frictional wall from the occlusal to the gingival over the old method of dressing down the occlusal surface to a flat surface with a large wheel stone.

In determining the position of the gingival margin, in all this work we are guided by Dr. Black's rules of cavity preparation; when the gum tissue and tooth crown are in their normal relation the margins in the interproximal spaces must be carried just beneath the free margin. On the buccal and lingual, the soundness of the enamel surface will decide where it should be placed, preferably keeping it away from the gum as far as possible. Under any condition, however, when you must carry the crown to the gingiva, you must go slightly beneath it. Where the gums have receded, apply the same treatment you would in any operative precedure, wherever possible, keeping all margins above the cemento-enamel junction.

Fig. 2 represents what we term a three-quarter crown for an upper molar; the application of which is more universal of these teeth than any other attachment excepting possibly the MOD inlay. Instrumentation in the main differs but little from that for the full crown, with the exception, that the buccal surface is not included, the crown terminating buccally with a typical MOD inlay margin. Just as little tooth surface should be removed from the mesio and disto-lingual angles as will be necessary to allow the thinnest gingival margin possible at these points, for the reason, that the longest distance mesio-distally should be from A to A in *Fig. 2*, and the shortest from B to B, being the occlusal openings of the grooves, these being the features which guard against lingual displacement and give the necessary grip upon the tooth. Extension for prevention must be practiced to the extreme wherever an inlay or three-quarter crown is used as a bridge abutment. The mesio and disto-buccal angles must be extended far enough out to make the margins visible in their entirety for their full length after the dummies are assembled. The failure to do this will result in recurrent decay at these points. The two parallel grooves, (not shown in the figure,) must be placed just as far buccally as the case will permit and parallel to the long axis of the tooth. The farther you place them buccally the more tooth structure you will envelope with the crown. Grooves are never made across the occlusal, this surface merely taking the form of a step terminating in a slight acute angle with the buccal wall of the preparation. The lower molar is the only tooth in the mouth where the buccal is the third surface used in connection with mesial and distal, to make a three-quarter preparation; on all others using the lingual. The reason for the difference being the natural inclination of this tooth

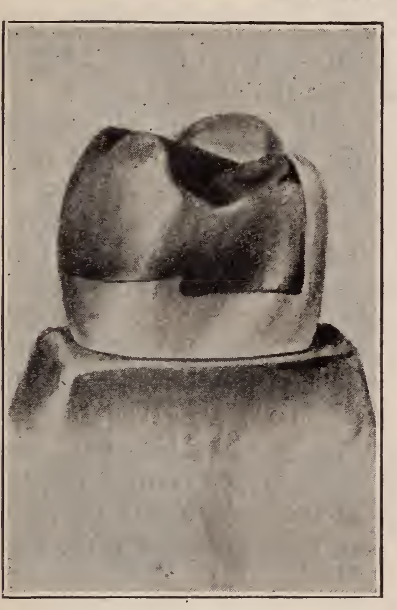

Fig. 3.

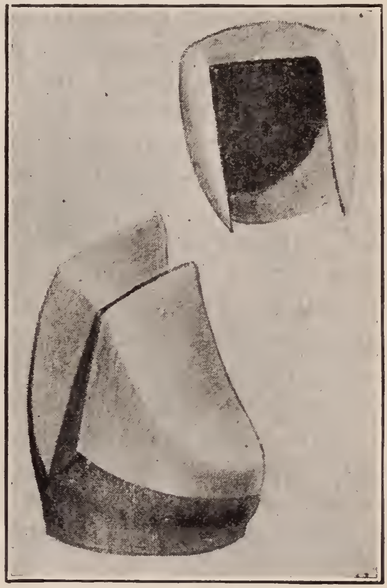

Fig. 4.

Fig. 3—Finished Three-quarter Crown in Position.
Fig. 4—Preparation of Central Incisor and Finished Three-quarter Crown.

lingually, making necessary the cutting of this surface to receive this crown, but very little.

Decay along the buccal surfaces at the gingiva, in patients who have reached the point in life where these restorations are necessary, is prevalent, and the opposite we find true on the lingual. *Fig. 3* shows the three-quarter crown finished and in position.

Three-quarter crowns find their greatest use in the six anterior teeth, which are the same in design as the central, shown in *Fig. 4*. *Fig. 4* is a central incisor showing the preparation and the finished crown.

Fig. 5-AA represents the two initial cuts which are accomplished with a vulco-carbon disc removing simply the contact points of the mesio and disto-lingual angles, reaching to the gingiva at these two points, AA-AA. Very necessary is the manner in which the stone is held. The correct position is shown by the lines CC, in *Fig. 5*. Cut is made slightly convergent with the long axis A-A of the tooth toward the incisal. The incorrect method is (not shown in cut) a very common fault, many times resulting disastrously, for the reason, that if too much tooth structure is carelessly removed from the gingival point, the balance of the tooth above it must be cut away in order to allow the crown to draw. Not only does this weaken the preparation, but causes many hypersensitive teeth. To avoid injury to the contact points of the teeth contacting with the one under preparation, separation should be gained and a metal matrix placed over them previous to the use of the carbo disc.

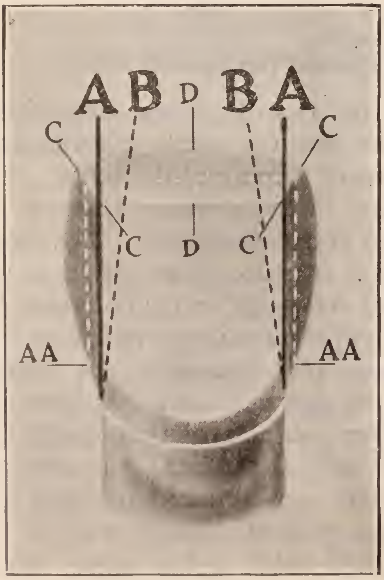

Fig. 5.

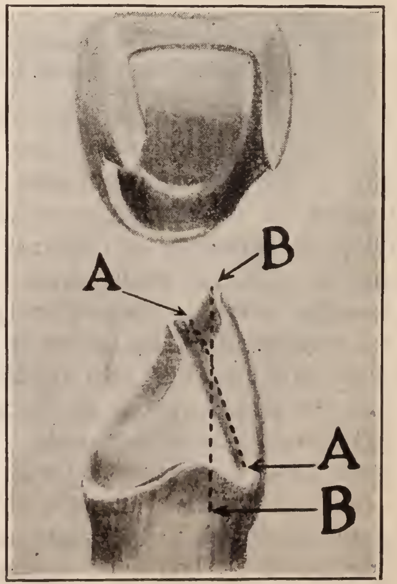

Fig. 6.

Fig. 5—Preparation of Central Incisor.
Fig. 6—Preparation of Canine and Finished Three-quarter Crown

Second step, *Fig. 5-DD,* illustrates the removal of a sufficient amount of the lingual plate of enamel to permit the restoration and protection of the incisal angle. The incisal end is protected with a long bevel in exactly the same way and for the same reason that we protect a porcelain facing when used as a dummy.

Fig. 6 illustrates third step or the correct method of preparing the incisal step which part of the preparation is accomplished by the use of small cylinder carborundums, completed with a large inverted cone bur No. 40 or 41. The bur being shaped as it is, produces an acute angle at the junction of the incisal and with the labial plate, adding greatly to the resistance against displacement.

Fig. 6 also gives us a definite idea of the position a groove should occupy in an anterior three-quarter preparation, the correct placing of which is of vital importance. This groove should always be started between the lingual and labial plates of enamel at the point made by the acute angle of incisal step, running parallel with the incisal third of the labial plate of enamel and terminating in the extreme mesio and distolabial angles, as illustrated in the cut at the lines A-A. You will note that in the instruction for placing the groove in the bicuspids and molars, its position was parallel to the long axis of the tooth, but were we to use the long axis of an anterior tooth as a guide, we would be utilizing the shortest possible distance from the gingiva to incisal that the crown of that tooth affords for the reason that, on account of the dip in the cemento-enamel junction incisally at this point, BB, and when we take into consideration that the strength of our preparation lies only in that part of the tooth crown engaged, extending from the bottom of one groove around the lingual surface to the bottom of the groove on the other side, we will see that we have taken in only the weakest part of the tooth and have lost the advantage gained by utilizing the distance between the long axis and the correct groove position.

Aside from this, the groove paralleling the incisal third of the labial plate and terminating in the extreme gingival labial angles, will carry those margins into practically immune territory, and will automatically parallel these abutments with the posterior abutments, for the reason that in the normal set of teeth, the centrals tip slightly forward at the incisal, the laterals and cuspids not quite so much and the biscuspids and molars practically straight.

Fig. 5 also is shown for the purpose of emphasizing that the grooves must be parallel or as near so as a man can make them with instruments at hand. They are made by using a tapered cross-cut inlay bur, starting with the smallest size and using larger ones as the case progresses until they are shaped properly. They must be wider at the incisal, labiolingually, than at the gingival end to allow a slight leeway in placing the crown. The two parallel lines AA in the *Figure* are to illustrate the necessity of correct preparation. The dotted lines, BB, illustrate the incorrect preparation which is very often seen, that is, the cutting of the grooves to the position which they outline. If these grooves were placed convergent to each other so that they would meet at any common point beyond the incisal, the closer that point is brought to the tooth, the more you will have to depend upon cement for retention. A properly constructed three-quarter crown when started to place, should slide in frictional resistance from the time that the gingival ends enter the incisal opening until the crown is seated in position, cement being merely the material used to hermetically seal the joint.

The rigidity of any of these attachments depends first on the bulk of the material which we have from a point designated by AA, *Fig. 5*, passing upward to the angle across incisal to opposite angle to a point designated AA. The depth of the incisal step regulates this bulk and the distance measured from D to D should be equal to the distance included from C to C. The shape of the floor of the incisal should always be the same as the incisal end of the tooth upon which it is made.

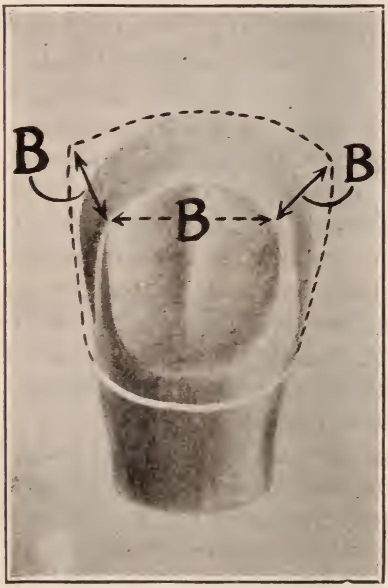

Fig. 7.

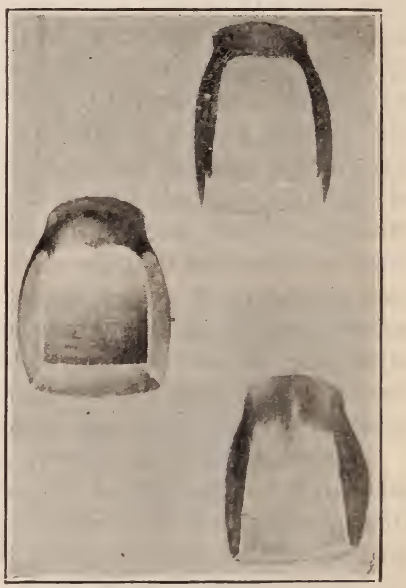

Fig. 8.

Fig. 7—Preparation of Canine.
Fig. 8—Stages in Preparation of Central Incisor.

In the central incisor it is practically a straight line. In the cuspid, as per illustration in *Fig. 7*, it will take more the shape of a V, dependent upon the sharpness of the cusp. A common error in preparation of a cuspid is to place the floor of the step as outlined from A to A in *Fig. 5* for an incisor. You will notice that if the step is placed deep enough to give the breadth at the incisal angles at B-B-B, *Fig. 7*, how dangerously near we would encroach upon the pulp.

In some cases the lower incisors are called upon to act as abutments, the only difference in this preparation from an upper being that the lingual third of the enamel plate is left intact only that much being removed as is necessary to produce a shoulder and incisal bevel.

The procedure is necessary for the reason that were we to remove the lingual plate entirely, we would so narrow up the approximal surfaces labio-lingually that we would have very little frictional wall remaining. Being on the lower jaw, the occlusion does not have to be taken into consideration on this surface, the disadvantage being that the finished crown is necessarily slightly thicker on the lingual than the tooth on which it is placed, but that is of small moment.

Bibliography:
Edward T. Tinker, "Fixed Bridgework."

WAX MODEL PATTERNS*

BY E. L. KNOX, D.D.S., DALLAS, TEXAS

IN CONSIDERING THE TECHNIC for obtaining a wax pattern in gold inlay construction, we should first familiarize ourselves with the working qualities of waxes, their various physical properties and characteristics, and select a wax that softens at low temperature, forms a mobile mass, hardens, and will not distort at mouth temperature; that does not chip or flake when carved, melts at high temperature, and lastly, that does not adhere or stick to a matrix.

We should have in mind a picture of the finished product, with an exact duplicate of the lost structure of the tooth, and the desire to obtain an inlay so accurately fitting that it will retain itself in the cavity when seated, by gripping the walls tightly on all surfaces, and depend only upon frictional wall retention.

All cavities with a missing wall should be supplied by the use of an accurately fitting matrix.

For all three-quarter or full shoulder preparations, a 36-gauge aluminum or copper band should be fitted accurately about the gingival of the tooth, with a space from one to two millimeters, and following the free margins of the gum. This space will allow a slight overthicknes at the gingival of the wax pattern, which can be feather-edged when the band is removed. At the occlusal, the band or matrix should be the exact length, from the gingival to the occlusal of the tooth, and trimmed accordingly.

Let us now consider that we have a band fitted for a three-quarter or full-shoulder pattern. After the band has been properly fitted about the prepared tooth, the wax is heated by dry or moist heat, a matter of choice only, as it will make no difference in the fitting of the finished product. The wax is then pushed to place by the thumb with a steadily increased pressure, retaining pressure from one-half to one minute.

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*Part two of symposium on Gold Inlays, Texas State Dental Society, March, 1921.

Now there is a reason for that continuation of pressure on the wax, the reason being, that wax contains the property of elasticity, and has a tendency to spring back to the bulk of the original mass from its furthermost point. This pressure prevents, to a great degree, the functioning of this characteristic. The wax is then cooled and all surplus wax removed or trimmed away from the band. The band and contents is removed intact, and, with a plastic instrument, a small amount of wax is flowed along the gingival of the wax pattern. This mass is again replaced on the tooth with a steadily increased pressure, retaining same for from one-half to one minute, to prevent, as stated before, the back movement of the wax at this stage.

We are now ready to begin the trimming of the occlusal. Each sulci, fissure and cusp should be duplicated exactly as nature intended. Too much time and pains cannot be taken in this work, as very much depends upon the anatomy of the occlusal surfaces, for nature intended each groove, sulci, fissure and cusp to play its important part in mastication and in preserving the investing tissues. The occlusal having been properly restored, we are now ready for the removal of the band, which can be done by playing a small knife-edged stone up and down on the surface of the band, cutting it through and removing.

Now let me impress upon you the importance of not allowing the wax pattern to move the least bit, for, at this stage you are in danger of losing the frictional wall retention, if the wax pattern is allowed to move.

We have had easy sailing up to this point, for the band has accomplished the purpose of retaining the wax pattern in place. After the band has been removed, a small piece of cotton moistened with ice water and held on the occlusal surface with slight pressure, enables the operator to trim and burnish the margins and restore the proper contour of the tooth without allowing the wax pattern to move.

At the gingival, the wax pattern should follow the outline of the margin of the gum, and be brought to a feather edge.

For a three-quarter cast, the wax pattern being ready for removal, it is done by first cooling the wax, then mounting the sprue in the usual way by heating the sprue and placing it at a point on the wax pattern that will allow the gold to flow to all parts of the mold by gravitation.

For a full shoulder cast crown, the technic is slightly different. At the point of finishing the contour of the wax pattern, the wax pattern having been properly finished, a slit in the wax is made with a sharp instrument from occlusal to gingival. The wax pattern is now ready for removal. Now then, a small piece of mica is cut the length of the slit in the wax and the width of the thickness of the wax and placed in the groove previously cut. This is done to allow for the shrinkage of the gold, for a circle cannot be cast and retain the same size as the wax pattern. This cast should be fitted on to the preparation and driven to place. After which the cast can be removed, and solder flowed into the slit in the crown.

INVESTING AND CASTING*

BY ALLEN N. KEARBY, D.D.S., DALLAS, TEXAS

A CONSIDERATION OF THE Investing of Wax Models, "Burning Out" Process, Treatment of the Casting Metal, Casting, Preparatory Treatment of the Cast and Cementing to place.

In the restoration of lost tooth tissue by means of the cemented cast gold inlay, there are ten steps, any one of which, if neglected, will result in failure to give to the patient the service to which he is entitled. These steps I have, for convenience, arranged in the order of their execution as follows:

1. Cavity, three-quarter shoulder crown and full shoulder crown preparation.
2. Manipulation and carving wax model.
3. Mixing of the investment material and investing.
4. Time allowance for proper crystallization of investment material.
5. Heating of invested model and burning out of wax.
6. Treatment of casting metals.
7. Casting and preparatory treatment of cast.
8. Seating of the cast.
9. Toilet of the cavity.
10. Cementing and finishing.

Doctors Wheless and Knox have given a most thorough and lucid exposition of cavity preparation and manipulation and carving of the wax model. My paper begins with the investing of the wax model.

Before investing, wipe sprue-mounted wax model with alcohol, or —still better—spray with ether to remove all saliva and mucus. There are several good investment materials, but I prefer Taggart's which should always be mixed in definite proportions, and is easily done by using the little balance supplied with each package.

Use a large rubber plaster bowl, and a large rubber or German silver spatula, both of which should be scrupulously clean. The water to be used should be at a temperature of 110 degrees F. so as to overcome shrinkage of wax. Pour this water from balance into mixing bowl; sprinkle in investment material and proceed to mix for two or three minutes by holding flat side of spatula close to side of bowl, all the while rotating bowl. Now, jar bowl by alternating lifting and dropping on bench, all the while rotating bowl on its side. This is continued for one or two minutes in order to bring air to the surface, and so eliminate air bubbles from the cast. Now, take a small sable (camel's hair is not so good) brush; pick up a small quantity of dark investment from the surface (this is mostly graphite and very smooth) and paint both wax model and sprue with a very thin coating. Then put flask in place and fill with investment material; letting it run down the side of the flask. Do not jar flask as investment should be sufficiently fluid to flow freely.

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*Part three symposium on Gold Inlays before the Texas State Dental Society, March, 1921.

Not less than one and one-half hours nor more than two hours should be allowed for crystallization of the investment material.

The sprue-former should be disengaged from the flask, the sprue heated and removed. Invested model is now ready to be heated; and for this purpose I believe some form of controlled heat is essential in order to obtain best results. Personally, I prefer the electric oven, and in this connection will say that the Maves electric oven is an excellent one. In using this oven the flasked model is placed in the oven, sprue-former end up, current turned on with oven cover off, and at the expiration of ten minutes cover is replaced; and no further attention given it until twenty-five minutes have elapsed. The cover is now lifted and if burned wax is smoking, cover is replaced for five minutes or until no smoke can be seen. The flask is then carefully removed and allowed to cool to room temperature; as all inlay and bridge abutment castings are made in a cool flask.

Practically all metal for inlay and bridge abutment castings is 22K gold, as demonstration has shown this to give best results.

The metal should be absolutely free from all contamination. This is easily accomplished when only new metal is used; but, as there must always necessarily be an excess button, and as we do not care to sell this as scrap, we re-use it. The used button should not constitute more than one-third by weight of the metal to be cast. In other words, always add two parts of the new metal to one part of old metal. In these proportions place on charcoal block, put blow pipe flame on it and when fluid, sprinkle on a small quantity of Ney's oxidizing flux, and while hot drop in a hydrochloric acid bath; wash with water, again place on charcoal block, and when melted sprinkle with small quantity of Ney's reducing flux, and it is ready for casting.

In casting, do not over-heat metal, as in so doing the low fusing base metals are volatilized, and, as a result, after several re-heatings we will have a metal that approximates 24K instead of 22K.

I use a Roach centrifugal casting machine and a Kansas City oxygen-gas blow pipe. The cool flask is locked in casting machine and metal placed in crucible. Regarding the amount of metal necessary for a given casting, weigh wax model, then use twenty-one times as much metal. This will give just the right amount of excess. The temperature of a metal at the instant of casting is difficult to determine, but I get the best results by casting while the molten metal is rotating, and before it begins bubbling. I believe bubbling signifies volatilization, therefore, too much heat. Remove casting from dry investment, (it is more readily cleaned when dry) brush with stiff bristle brush;

then brush again, using water. In compound restorations it is necessary to have good contact with adjoining tooth, and to obtain this in case of inlays, I flow a small piece of 18K solder at contact point; but for bridge abutments it is necessary to add a small amount of wax to model at contact point, as solder would be fused and contact point destroyed in soldering bridge.

Now, boil casting in hydrochloric acid, and wash in water. Polish roughly with small stones and discs. At this time carefully observe cavity surface of casting for small nodules, and if any be found remove with a sharp spoon excavator, because if allowed to remain, these nodules will materially interfere with the proper seating of casting. In seating, it is of paramount importance that the cast really go to place; that is, all margins of the casting should be in close contact with the cavo-surface margin, otherwise, there will be a cement line with recurrent caries inevitable. Now look to the contact point and be sure it is just right. I ascertain this by frequent trying in, taking off or adding a little solder until dental floss will pass through with a distinct snap. The cast should be as nearly polished and finished as possible before cementing, because it is infinitely easier, but do not overdo it and so expose cavity margin.

In casting a full shoulder crown, it is necessary to use the indirect method to the extent of preparing an amalgam model of tooth to be crowned.

After casting the crown, it is placed on this amalgam model and driven to place; then the slit, which Dr. Knox has told you in his paper to cut in wax model, is soldered and crown again driven to place on model. This use of the amalgam model is necessary because, without it, it will be almost impossible to drive crown to place on the prepared tooth, being due to the contraction of the metal in cooling.

Cavity toilet is essential and is as follows: Isolate tooth with cotton rolls, wipe cavity with pledget of cotton moistened with water, dry, apply eugenol on pledget of cotton, follow with alcohol on cotton to remove every tract of eugenol, then use chloroform on cotton pellet (I find chloroform causes less pain than alcohol) to obtain dryness. Cement slab and spatula should be absolutely clean, the cement mixed to a creamy consistency, not too thick, else the casting cannot be forced to place and all your previous technic go for naught. Both cavity and cavity surface of cast are now covered with cement, cast placed in position and forced to place by continuous pressure and tapping with a mallet. Dryness should obtain for five minutes, then remove cotton rolls and rinse mouth with water.

Wait another ten, or preferably, twenty minutes for cement to crystallize; remove excess cement and finish with sand paper and cuttle fish disks and rubber polishing cups, with pumice, until every part of casting is flush with tooth surface.

If you haven't the patience to wait for thorough crystallization of the cement you had better have patient return and finish at that time.

Gentlemen, every minute detail of the technic as outlined by Drs. Wheless, Knox and your humble servant is important, yet I am sure some of you think it is too exacting, but go home, try it out and you will be convinced it is well worth while.

BIBLIOGRAPHY:
Tinker, Maves.

CLASSIFICATION OF FULL DENTURE PATIENTS FROM BOTH MENTAL AND PHYSICAL STANDPOINT.*

BY JOHN B. LA DUE, D.D.S., CHICAGO, ILLINOIS

BEFORE GOING INTO THE SUBJECT of classification, I wish to dwell a little on the sentimental side of full denture construction and make a plea for more application and better service in this work. There is no class of patients who fall into our hands more deserving of the very best we can give them than edentulous patients. They are crippled to a great extent for they have lost a part of the human anatomy that is *impossible* to replace so as to give *normal* efficiency. Teeth are essential to health and happiness. Practically all our bodily sustenance is prepared for digestion through mastication; thorough mastication means lightened work for the digestive organs.

The edentulous patient is disfigured and the overcoming of that disfigurement depends upon the skill of the dentist. Possibly to some of the older patients this does not mean so much, but today we have many young patients, who, because of ill health coming from infection, are advised to have their teeth removed. To these, appearance is the main issue.

With what means are we meeting these conditions? They are in our hands and the degree of satisfaction obtained lies with us. If you say to the average dentist, "What are you doing in denture work?" Invariably his answer is along the following lines: "I don't like it very well. There is a lot of grief in it and I can't get fees that will pay me to take the time to go into all the details." In answer to these, I will say that I believe that the things we like the least are those that we know least about. There is a lot of grief and trouble in denture work even though you love it. The old adage that "Anything that is worth doing at all is worth doing well" surely applies here. Denture construction is simply the carrying out of a series of details, all of which are not simple but each absolutely essential to success. As far as the fee is concerned, I honestly think that it will take care of itself. Ability plus self-confidence makes a selling combination that is hard to beat. Care should be taken not to sell more than you can deliver. This is easy to do when you are selling something that is not over 35% efficient in any given case. Study your patient and the mouth conditions; put all your efforts into it and the chances are that you will get a good fee and in addition, appreciation from your patient. This is one of the things that make life worth the living. The cause of most of the troubles of life is the being willing to accept the inferior thing. If we will endeavor to improve ourselves and practice the golden rule, we will get our share of all we can take with us when we leave this world—credit marks for the good we have done humanity.

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*Read before the Tennessee State Dental Association, May, 1921.

Upon what basis do we determine with any degree of certainty what is possible to deliver in full denture service? We must consider every detail and feature of the individual case in order to outline the proper treatment and to instruct the patient as to what may be expected as to appearance, comfort and efficiency. This education is of great importance and a record should be made as the examination progresses and each detail explained. This logical explanation has much to do with obtaining the confidence of the patient. In case no agreement is reached and the patient consults someone who is less interested, the desire to return to you will be accentuated. A fee should be named and full explanation clearly given as to what that fee includes. Excepting treatment cases, I believe that when dentures are once satisfactory, our contract is fulfilled. We cannot assume responsibility for tissue changes.

Much has been said and written by different men about classification of mouths, but the following, compiled by Dr. M. M. House, embodies and covers all:

MENTAL CLASSIFICATION

It would be absurd, unjust and inexcusable for any denture prosthetist to allow patients with unfavorable mouth conditions to expect from their artificial dentures a service as efficient and satisfactory as that enjoyed by other patients who have favorable conditions.

During consultation relative to denture service, patients should be encouraged to relate their experiences, difficulties and expectations regarding the service they are seeking. Their mental condition may then be better understood and may be classified as follows:

1 A. Those who have come previous to extraction and have no experience in wearing artificial dentures; such are dependent upon the denture prosthetist for proper diagnosis and prognosis and education.

1 B. Those who have worn satisfactory dentures, are in good health and of the well-balanced type who may be in need of further service.

2 A. Those who, while suffering ill health, are seriously concerned about the appearance and efficiency of artificial dentures, and therefore, are reluctant to accept the advice of their physician and dentist and are unwilling to submit to the removal of their natural teeth.

2 B. Those wearing artificial dentures unsatisfactory in appearance and usefulness, and who doubt to such an extent the ability of the

denture prosthetist to render a service that will be satisfactory that they often insist upon a written guarantee, or expect the denture prosthetist to make repeated attempts without an additional fee.

3 A. Those in bad health, with long-neglected pathological mouth conditions, who dread dental service and submit to removal of teeth as a last resort, and are positive in their own minds that they can never wear artificial dentures.

3 B. Those who have attempted to wear artificial dentures, have failed, and are thoroughly discouraged; are of the hysterically nervous temperament, very exacting, and will demand from artificial dentures efficiency and appearance equal to that of the most perfect natural dentures.

4. The indifferent.

PHYSICAL CLASSIFICATIONS

Tone and Development of the Muscles of Mastication and Expression

1. A case in which degenerative changes have not occurred.

2. A case where approximately normal functions have been preserved by the wearing of artificial dentures.

3. A case in which a subnormal condition has resulted from the absence of natural or artificial dentures or from the wearing of inefficient artificial dentures.

BONY STRUCTURES—PHYSICAL SIZE

1. Large upper or lower, affording the greatest possible advantages for stabilizing the dentures.

2. Medium size, affording less advantage for stabilizing the dentures.

3. Small size, presenting much difficulty in stabilizing the dentures and affording much less efficient service.

NOTE: Any mouth may present one class upper and another class lower.

MORE EFFICIENT PROFESSIONAL ORGANIZATIONS*

BY ALBERT R. ROSS, B.S., M.S., D.D.S., LAFAYETTE, INDIANA

IN CONCLUDING TWELVE YEARS of active service as an official of the Indiana State Dental Association, the writer is more than ever confirmed in his belief of the vital necessity that our professional organizations be as efficient as possible. The required efficiency can be secured only when the organization is as perfect as it can be. Every line of activity is fundamentally dependent upon the efficiency of our professional organizations, regardless of whether such activity may consist of educational propaganda, improved dental legislation, research experiments or other phases of dentistry.

It should be unnecessary for the need of an efficient organization to be submitted to any body of intelligent Americans, in order to prove that united effort is capable of large accomplishments. In 1914, and for four years thereafter, the Imperial German Empire gave to the world the greatest object lesson it ever received in all its history of a nation of people being organized and trained for the purpose of military conquest. In 1914, the four railway brotherhoods of the United States gave to the people of this country an object lesson in the power of organization when, for the first and only time in the history of this country, an organized minority issued an ultimatum to Federal Congress and secured the enactment of legislation within the time-limit contained in the ultimatum.

In the two examples of the effectiveness of organizations which have just been quoted, the underlying principle was wrong. The supreme justification for any organization is the service it renders to the public. *Advancement for the individuals of an organization should be secondary to the public obligation.* This is particularly true of any organization of men and women engaged in any department of public and individual health. There is an ever-increasing responsibility upon the dental profession to do its share in maintaining and advancing civilized society. Since the respective State Dental Associations are the keystone units in the organization of our National Dental Association in relation to the district Component Societies, it is obvious that the respective State Dental Associations should be strengthened as much as possible in order to fulfill their obligations to the public. The National Dental Association is a delegate body, deriving its powers from the respective State Associations; and it is vitally necessary to have strong State Associations if a resultant strong National Association is to be secured.

The relationship existing between the National Dental Association, the respective State Dental Associations and the District Component Societies should be perfected and standardized to such an extent as to require a minimum of time for a maximum of efficiency in caring for the business matters of the respective organizations. Probably with the exception of a few District Component Societies located in metropolitan centers, the secretaries of District Component Societies receive no compensation for the time they give to their secretarial duties. In fairness to these men, a system of accounting should be prepared, of as simple a time-saving method as possible, in order that the business records may be handled with the least expenditure of time from these busy practitioners. At present, District Component secretaries have no established system of showing whether a member is paid up or delinquent for dues. The only records that are furnished to these Component secretaries consist of a book of membership cards for the members of their respective societies, and without consulting the book of cards of the preceding year, a Component secretary cannot tell whether a member is delinquent or not. In consequence, it is not an unusual occurrence for a Component secretary to issue a membership card to a member for the current year and later be informed by his State secretary that the member had not paid dues for the preceding year. Such occurrences usually result in dissatisfaction, misunderstanding and resentment upon the part of such delinquent members when they are requested to remit for the preceding year after having received the membership card for the current year. This unbusinesslike method of safeguarding the membership cards of Component members could be corrected by a combined uniform ledger and journal provided by the National Association to the respective District Component Societies at cost.

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*President's Address, Indiana State Dental Association, May, 1921.

The respective State Dental Associations should also be furnished a standard system of books by the National Association at cost. If such a system of accounting were devised under the advice of expert accountants, it would be a comparatively easy accomplishment to have all of the State Associations and all of their respective District Component Societies supplied with a standardized system of bookkeeping which would enable them to keep the membership and financial records of their respective organizations in an accurate manner with a minimum amount of time required, and necessitating no expert knowledge of bookkeeping. The writer respectfully recommends that the delegates from the Indiana State Dental Association to the National House of Delegates be instructed to submit this matter to the proper National Association officers for their consideration.

Several years since, when the writer was secretary of this Association, he submitted a suggestion that the annual membership cards furnished by the National Association be of a different color for succeeding years in order to facilitate identification and registration of members. This is merely an adaptation of the custom of certain fraternal organizations whose membership far out-numbers the roll of the National Dental Association, and will entail no additional cost upon the National Association. If two different colored inks are used in the printing of membership cards, there will be a considerable increase in the cost of the printing; but a distinctly different colored card for succeeding years will cost no more than plain white cards; will require but one insertion in the printing press and will very greatly facilitate registration of members at largely attended dental conventions. This matter is also respectfully submitted with the hope that the National delegates from this Association may be instructed to use their efforts in promoting this much needed arrangement.

At the 1920 meeting of this Association a resolution was submitted to the members to provide for submission to the National Dental Association of a method by which some advantage might be secured from national advertisers of dental preparations, in the way of educational propaganda. This method involved, with proper safeguards, arrangements to be made with national advertisers of dental preparations to set aside space for the regular publication of a slogan conceived by Dr. Howard Raper, formerly of Indianapolis, which was, "Never let your teeth ache—Ask your dentist why?"

The resolution provided that the advertisers who used such journals as *The Saturday Evening Post, Ladies' Home Journal, Woman's Home Companion,* and other weekly and monthly periodicals of a popular nature, be requested to give space for the regular publication of the slogan just named; with a definite understanding, agreed to in writing, that the request for such publicity, coming from the National Dental Association should not be construed as an endorsement of the particular dental preparation that was being advertised; and that the manufacturer should agree to make no intimation of any nature in his advertisements that would lead the public to infer that the National Dental Association had endorsed his particular dental toilet preparation. At the meeting of this Association, when the resolution was submitted, the objection was made that some manufacturers of dental toilet accessories might in some way intimate to the public that their dental preparations were endorsed by the National Association if they had been requested to give publication to the slogan as above outlined; and an opinion was advanced by an official of the National Dental Association that the National Board of Trustees would not approve the resolution. The resolution was rejected by a vote of the members of this Association because of the objections entered and the opinion advanced by the official of the National Dental Association.

The writer, who was the author of the resolution referred to above, was unconvinced at the time that the objections offered were sufficiently valid, and he is still of the same opinion. The writer is of the opinion that manufacturers of dental toilet articles who are national advertisers would be very willing to give space in their advertisements for the short slogan already quoted. He is further of the opinion that with a definite, written understanding that compliance with such request on their part should be in no sense construed as an endorsement of their preparations by the National Dental Association, and that they were prohibited from intimating in any manner to the public that their dental preparations had received such endorsement; there would be no danger whatever that any dental manufacturer would violate such an agreement. Should any manufacturer break faith, he could soon be brought to terms by the proper publicity being given the matter in the columns of the *Journal of the National Dental Association.* On the other hand, try to realize the tremendous accumulative effect of the weekly and monthly publication of such a vital message of preventive dentistry. The continued publication of such a message would have such far-reaching effects, in the judgment of the writer, that he respectfully recommends that the delegates to the National House of Delegates from this Association be instructed to use their best efforts in enlisting the cooperation of the National Association in this plan of educational propaganda.

In compliance with the instructions issued by the members of this Association in 1920 to the incoming president, the writer, during the year just closed, has visited thirteen of the sixteen Component Societies. He was forced to miss attending the meetings of three Component Societies because of societies in different parts of the State having meetings scheduled on the same day. He is indebted to the secretary, Dr. A. J. Kimm, for having represented him and delivered his message to the Third District and South Central Societies at their respective meetings; and to Dr. R. R. Gillis for having represented him at the meeting of the Northwest Dental Society. As a result of his experience during the past year, the writer does not favor this Association requiring its president to visit all of the Component Societies during his year as presiding officer; but he does favor some official representative of this Association visiting each Component Society. He would recommend that the president, president-elect, secretary and executive committeeman be designated as the representatives to visit the Component Societies on behalf of this Association, with their necessary traveling expenses on such official visits paid by this Association, and leave it to these four officials to make their own apportionment of the societies each one should visit. With four men to cover the sixteen Component Societies, each one of them would be required to visit only four during the course of the Association year. Such an arrangement would not place any great burden upon any one official and all of the Component Societies could be visited notwithstanding that other Component Society meetings might be scheduled for the same date. The four officials designated were selected because they are the officials who are most intimately informed of the affairs of this Association.

In visiting the Component Societies of this Association during the past year, the writer was impressed with the realization that the Component Society dues as well as the dues for this Association are too low. Most of the Component Societies charge only $1.00 annual dues, and this amount is totally inadequate to finance the necesasry expenses of the societies and provide sufficiently attractive programs even for one meeting of one day's duration for the smaller societies.

Where Component Societies have two program meetings during the year, it is necessary for them to levy assessments on their members, particularly if the societies are small in membership. Where the society is large and has a program meeting every month for the larger portion of the year, it is necessary to make a material increase in the Component dues in order to finance such a large number of meetings. In the judgment of the writer, a very large increase in Component dues should be carefully regulated so that it may not prove prohibitive to members retaining their membership in the State and National Associations. Such large increases of dues are only justified when a sufficient number of program meetings are given in the course of a year, and when the large increase applies to members of a society located in a large city where there is practically no expense involved for the members attending the meetings. If the jurisdiction of the Component Society covers several counties, some special concession should be made to the members residing in the adjoining counties to compensate them for the expense involved in attending the meetings and the added inconvenience on their part in being able to attend.

In connection with the subject of increased dues not only applying to the Component Societies but also to this Association, the writer has the following recommendation to offer. He recommends that the minimum dues for National, State and Component Societies should be $10.00 per annum and that the maximum dues should be limited to $20.00 per annum. The maximum dues should be granted only when proper consideration is given to members who are not conveniently located to attend the meetings; when there are not less than six program meetings a year; when the members of the Component Societies by at least a two-thirds majority favor the adoption of the maximum dues, and when members in adjoining counties are not required to pay the maximum fee when they are not in a position to receive the full benefit without additional costs on their part by virtue of their location. With the minimum annual dues fixed at $10.00, $3.00 of which would go to the National Association, the remaining $7.00 from each member should be divided by giving $4.00 to the State Association and $3.00 to the Component Societies. Such an arrangement of dues will enable the small Component Societies to finance better programs for their meetings; and will enable this Association to finance still better programs at its annual meetings and to conduct some constructive work in meeting the responsibilities of the profession to the public which it cannot meet at present, because of an insufficiency of funds. It is earnestly recommended to the members that they adopt such an amendment to the constitution and by-laws at this session, but such action can only be secured by unanimous consent. In the event of the failure of this Association to adopt the recommended increase of dues at this time, it is earnestly recommended that the amendment be presented in order that it may be acted upon at the next annual meeting for final decision.

In visiting the respective Component Societies during the past year, your president submitted to twelve of the societies the proposition that a State-wide dental survey be made of the school children of Indiana for the purpose of securing evidence upon which might be based a plea for legislation to provide for the establishment of free dental clinics throughout the State. When the matter was presented to these Component Societies, it was with the understanding that it would be conditional upon the action that might be taken by this Association at its annual meeting and it was further dependent to a larger extent upon the kind of financial cooperation that might be secured from the State Board of Health, the State Red Cross Association, and the State Superintendent of Public Instruction. After the matter had been presented to twelve of our Component Societies, a conference was held by officials of this organization with representatives of the other State bodies already mentioned, and your representatives were informed that none of the other State organizations could assist in any way whatever in financing the proposed State-wide survey. With over 486,000 children in the graded schools of the State, with over 550,000 when the high school students are included, and without any reliable estimate of how many children there are in parochial schools, which would have to be added to the above numbers, it is obivous that this Association could not finance the printing, distribution and collection of the examination charts, the tabulation of the returns and the publication of the results with the subsequent distribution thereof, together with the stenographic expense involved in such a comprehensive line of activity.

It is indicative of the high type of members which make up this Association and its Component Societies when it is known that each of the twelve Component Societies, at which the matter was presented, endorsed it and the members agreed to donate their time to make the survey within their respective jurisdictions, without knowing how the members of any other Component Society had acted in the matter. The writer is perfectly confident that the four Component Societies that did not have the matter presented to them for endorsement because of the necessity for abandoning the original plan, would likewise have agreed to make the survey in their respective jurisdictions. No higher tribute could be paid to the Indiana dentists than to record the fact that approximately one thousand of them were willing to donate four or five days of their time, without compensation, to making a survey of the school children of the State of Indiana because of the value such a survey would have in assisting to promote measures of preventive dentistry.

At the conference of your officials with the representatives of the State Board of Health, Red Cross and State Superintendent of Public Instruction, the State Superintendent of Rural Red Cross Nurses informed your representatives that between thirty-five and forty counties of the State were supplied with Rural Red Cross Nurses who could make a fairly representative dental survey in their respective counties if furnished with the proper examination charts and given one month's time in which to conduct the work. The secretary of the State Board of Health expressed the opinion that with the evidence secured through these Red Cross nurses, sufficient material for legislative purposes could be secured by having detailed dental surveys made in but three or four counties of the State. The writer believes that it is feasible to secure a detailed dental survey in three or four counties of the State, and with general surveys in thirty-five or forty counties by Red Cross nurses, it should give a fairly accurate record of the mouth conditions of between thirty and forty thousand children. Such a survey with the limited stenographic service necessary, the printing of the examination charts and the publication and distribution of the results might possibly be financed for $500.00. This Association cannot finance such an undertaking with its present income, but if the members will adopt the recommendation already proposed for an increase of $2.00 in the annual dues of this Association, the Board of Trustees could be authorized to execute a loan for the necessary amount to finance the proposed limited survey, with the assurance that the increased dues in the next fiscal year would enable them to cancel the loan. Your president submits this matter to you for your very serious consideration.

It seems almost necessary that some definite evidence should be secured of the conditions existing among a large number of our school children, if we are to be successful in securing the enactment of legislation providing for the establishment of dental clinics. Without such evidence we would be forced to quote conditions in other states with nothing conclusive to offer that similar conditions were present in this State. The desired legislation probably should not require the establishment of free dental clinics because of the impossibility of securing sufficient clinicians and it would probably be unwise to have anything further than a dental examination made compulsory; but legislation should be enacted to provide a definite method by which free dental clinics could be established where the dentists in any community could be able to bring about such a service. If we are to measure up to our responsibilities to the public and if we are to fulfill our duty in educating the children along the line of preventive dentistry, it is necessary for us seriously to consider the proper action we should take in assuming our obligations. Some definite decision should be made, and some definite policy should be adopted if we are to be free from charges of neglecting our duties as members of a profession concerned in the health and welfare of the public.

In conclusion, the writer wishes to express his appreciation of the many courtesies that have been extended to him as president of this Association during the past year by the different Component Societies.

The members of this Association throughout the State have demonstrated that they are eager to contribute their personal services to a greater fulfillment of the responsibilities of our profession to the public. They have everywhere eliminated to a very great extent petty professional jealousies, and there is a genuine good fellowship established which is indispensable for the most effective cooperation.

During twelve years of active service as an official, it has been the valued experience of the writer to watch this Association in the establishment of its Component Societies, and the decided increase in its membership. During this period our State dental law has been strengthened until it has become unusually effective.

The writer has been greatly benefited by his participation in the activities of this Association during this period of time, and he considers it a very high honor to have been privileged to serve you as your president. He concludes his official service in the confident belief that this Association will continue to develop and strengthen itself to more completely discharge its obligations; and with the sincere wish that the future may grant to this Association a full measure of success in all of its activities, and give to the individual members a realization of satisfactory personal achievement.

SCHOOL DENTAL CLINICS AND THE TAX LEVY AS A MEANS OF ESTABLISHING AND MAINTAINING SAME*

BY DR. G. T. EPLING, WELCH, W. VA.

DIRECTOR JENKINJONES DENTAL DISPENSARY AND MC DOWELL COUNTY DENTAL CLINIC

ALL TAX PAYERS AND EVERY MEMBER of their families are entitled to the most advanced aids to good health. Health protection is as necessary as police and fire protection or maintaining streets and roads. It is public business and should not be put on a charity basis. It is neither a charity for the poor nor a luxury for the rich, but is the just due of every citizen. In general, the higher the social and economic development of a nation, the higher the taxes upon its citizens; but for every cent put into the development of a nation along these lines a much larger return is received, although it may not always be measured in dollars and cents.

The object of our Government is to establish justice, promote welfare and secure liberty for ourselves and our posterity. The Declaration of Independence proclaims all men equal, and endows them with certain inalienable rights, among which are life, liberty and pursuit of happiness, and that the word "welfare" as stated in the object of our Government, and "life" in the section of the Declaration of Independence, means health in my opinion, could not well be disputed and applies to ourselves and our posterity.

Health to the individual is as important as liberty, for without health there is no pleasure, or without liberty no happiness. National health is simply community health; and since the all-wise Creator has allowed us to work out our own salvation as to health and wealth, and has provided us with human intelligence and the natural resources and facilities with which to procure both, whatever the race or creed may be, education is the key to the situation.

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*Read before the West Virginia State Dental Society at Bluefield, April, 1921.

All the great men in the dental profession, all of the educators and most all well-read people of this and many other countries are keenly aware of the relation of the dental profession to the public health problems, because of the many bodily ills which are caused or contributed to by the prevalence of mouth infection. The great men of the medical profession are calling upon the dental profession to eliminate mouth infection as the next great step in preventive medicine. Therefore, the greatest service, in my opinion, that could be rendered the human family, is to educate them and conserve their health.

The educators of our country are doing their part so far as they can, and the dental and medical professions are awakening to the fact that preventive medicine and preventive dentistry must go hand in hand with the support of the school department, in order that our children who are the National Timber, and who will take your place and my place when we have finished, may emerge from the grades without adenoids, diseased tonsils, devital, missing or irregular teeth or any mouth infection, with full knowledge of how to retain this ideal condition, well equipped physically and mentally to advance rapidly through higher studies and meet life's battles with success.

Prof. Peter A. Mortenson, superintendent of public schools of Chicago, said in an address to Chicago dentists:

> "Education has changed—it is a bigger thing than it was—it includes not only mental improvement, not only an attitude of mind, but a physical building up. I consider mouth hygiene a very important phase of education and that an ounce of prevention is worth a pound of cure; that what a child sows the adult will reap; and that this task should begin before school age, if possible."

In the past, prophylaxis or prevention of disease, has been a vision or dream with the people, except smallpox, tubercular, diphtheria and typhoid vaccines, and the extermination of the mosquito as a carrier of the yellow fever germ, and not taken as a serious matter, in spite of the fact that such men as Dr. Erasmus Darwin, grandfather of Charles Robert Darwin, early in the eighteenth Century, said:

> "Man was made to be well; that the science of medicine would sometime resolve itself into a science of prevention rather than a matter or cure; and that the best medicine he knew of was an active, intelligent interest in the world and laws of nature."

Walt Whitman, soldier of the Civil War, editor, publisher, and poet, who was familiar with all conditions of mankind, in this and other countries, by reason of having engaged in most all vocations of life in this country and making pedestrian tours following the western rivers into Canada, must have in a sense noted the need of prophylaxis, as in one of his poems we read:

"Where the City of the Cleanliness of the Sexes stands,
Where the City of the Healthiest Fathers stands,
Where the City of the Ablest Bodied Mothers stands,
There the Great City stands."

And Oliver Goldsmith, a physician, poet, author, editor, journalist, who in 1764 wrote the "Traveler," which placed him at once in the front rank of contemporary poets, says:

"Ill fares the land, to hastening ills a prey
Where wealth accumulates and men decay."

And Goldsmith states also,

"Men who think must govern those who toil."

Thus placing the responsibility on the professions, educators and business men.

According to the late Sir William Osler, a physician, educator of international reputation, a graduate of Trinity University of Toronto, and the Medical School of McGill University, Montreal, in which institution he became professor of physiology and pathology, and later professor of clinical medicine at the University of Pennsylvania, professor of principals and practice of medicine at Johns Hopkins University, chief physician of Johns Hopkins Hospital, and at the time of his death was Regius Professor at Oxford, and the greatest authority on internal medicine in the world, said:

> "The problem of mouth hygiene and care of the teeth is the most important of any public health measure."

This great doctor also tells us that,

> "Most of the diseases which cause death in middle life are developed from conditions begun in childhood."

And that,

> "The neglect of the mouth and teeth is responsible for more loss of life than that of the use of alcohol in all of its forms."

He also said,

> "There is not a single thing in preventive medicine that equals mouth hygiene and the preservation of the teeth."

Such authorities as Dr. Charles Mayo, one of the world's greatest surgeons, Dr. E. C. Rosnow, of the Mayo Foundation, Dr. Oliver F. Osborne, of Yale College, Dr. Frank Billings, of Chicago, who served as president of the American Medical Association, have made statements that coincide with those made by Dr. Osler.

Dr. Otto U. King, connected with the Northwestern University Dental School of Chicago, and Secretary of the National Dental Association, in closing his very good article entitled, "Solving the Mouth Hygiene Problem," declared:

> "The organized dental profession must inaugurate a systematic campaign of educating the individual dentist to his responsibilities in connection with this great mouth hygiene problem. Too many dentists have never realized that the dental profession has a definite message to give humanity. We have it within our power to save human life and prolong the average human life.
>
> "I know the educators of our country are wondering why the dental profession has been so derelict in measuring up to its opportunity in discharging its obligations to the laity. However, the leaders of the dental profession today have determined no longer to shift the responsibility and have begun a systematic campaign of educating the public."

Dr. Thaddeus P. Hyatt, prominent dentist of New York and director of the Metropolitan Life Insurance Company's dental clinic, in discussing a paper on School Dental Clinics, stated:

> "That most cities are no better governed than the people deserve, and if the fathers and mothers could realize the importance of mouth hygiene and the large sum of money being spent on backward children, they would march to the City Hall and demand that a dental clinic be installed in every school house; that when the fathers and mothers wake up to the importance of physical welfare of the little ones, and the relation that dirty, diseased, uncared-for mouths have to ill-health, there will be no question as to what will be done."

It would be a long story to tell you of the many school dental clinics that have been put into operation through the efforts of dentists in many cities, towns and country districts, and we will only mention two or three of the largest ones, now in successful operation.

The Bridgeport Dental Clinic, for the City of Bridgeport, Connecticut, financed by funds appropriated from the city treasury, is said to be the model of them all, due to the personal attention given it by Dr. Alfred Fones, the director.

The Cleveland Public School Dental Clinic, due to the efforts of Dr. E. L. Pettibone the director, is meeting with great success.

The Detroit, Michigan, Dental Clinic is in successful operation, through the efforts of Dr. Charles Oakman, who in order to get a sufficient amount of funds appropriated, became a candidate for the office of the president of the Board of Education, and was elected, and got what was necessary to install the clinic in the schools of that city.

The reports from these school dental clinics show marked improvement in health, more rapid progress in school, a large reduction in contagious diseases and the number of school children retarded or failing to make their grades.

I would fail in my duty if I did not mention some of those who have contributed their private means to carry on this great work, the most important of which is the great institution at Boston, founded by the Forsyth Brothers, known the world over as the ''Forsyth Dental Infirmary for Children.'' Another of equal importance is the Rochester Dental Dispensary, founded by George Eastman, both of which are in every respect as complete as human intelligence and hands could make them. Since Mr. Eastman established the Rochester Dental Dispensary for children, the Rockefeller Institute, directed by Dr. Flexner, has added to the endownment of this institution, four and a half million dollars, which will make this institution the greatest in the world.

These institutions are all right for the cities in which they are located, *but they do not reach our boys and girls.* However, what is good for the children in these cities, is good for the children in Bluefield, Princeton or any other West Virginia city, town or country district, or any city or county in any other state, as it has been proven where statistics have been made, that the same conditions as to teeth decay and mouth infection exists throughout the United States as in Boston and Rochester.

I take the stand that this is not a condition to be met by charity and the only equitable way to solve it is by taxation.

The dental clinics for children in rural districts as well as towns and cities must go hand in hand with the public schools if the best results are to be obtained.

We have no institution more sacred to the American doctrine ''that all men are free and equal'' than our free school system and it would be un-American to select here and there a child for this service, whose parents were not able to pay for the service, making of that child a pauper and causing it to lose its self-respect, and a great philosopher has said ''Self-respect is the noblest garment with which a person may clothe himself, and the most elevating feeling with which the mind can be inspired.''

One of Pythagoras's wisest maxims is that in which he enjoins the *pupil to reverence himself.* The school children whose parents were in a position to bear the expense of dental treatment would no doubt point out the child accepting this service as having to go to the county dentist to have its dental work done, and the poor child would often feel that he was lowered in the estimation of his companions, by reason of this fact.

When a school board or county court appropriates money out of a public fund, it has no right to do so for one child and not for another, and in order that the child may retain its self-respect, the school dental clinic should be conducted as the public schools are, *free to all.*

I am thoroughly convinced, after my experience as director for the Jenkinjones Dental Dispensary, for four years, and as director for the McDowell County Dental Clinic for nearly two years, that McDowell County has now in operation a system of school dental clinics that should commend itself to any county in this or any other state, for the reason that our records show all school children have accepted the service of the Dental Clinic, no matter whether their parents were rich or poor. It is a fact that the mouths of both the rich and poor show the same condition as to the prevalence of dental diseases, and to my knowledge no parents have refused to accept the services of the dental clinics on account of being wealthy, and all children accept the dental service in the same spirit that they accept the service of their teachers at school, and as a part of the routine work of getting an education.

We had quite a number refuse to register the first time we visited the various schools, but so far as we have gone this year, the second inspection, we have averaged 98% of those attending school, and in many schools 100%.

There are at least fifty schools located in the mountains in McDowell County and we have to use wagons and, in one or two cases, sleds to get the equipment moved, but we are reaching the children, and where it is impossible to get the equipment to the school houses, the parents often bring them as far as eight miles.

We have had the loyal support of the school department and have been rendered great assistance in our work by the county superintendent and district superintendents, and school teachers have often walked eight to ten miles with their pupils to the dental clinic, in the rural districts, from schools on the mountains which we could not reach with dental equipment.

As director of this clinic, my greatest trouble is in securing dentists to do the work. There is a shortage of dentists all over the world today, and it is to be hoped that more young men and young women will enter dental schools, as at the rate dental clinics are being established, a demand for dentists is being created that cannot be supplied.

The course in all reputable dental colleges having been increased from three years to four years, resulted in a small number being graduated last year, but there will be a large increase of graduates this year over last year, and more dentists will be available for the clinics. All dentists graduating this year will have had training in preventive dentistry and will be well equipped to take up the work in dental clinics for children.

Dr. Edwards, president of the Canadian Dental Association, has set a high standard for dentists working for children in Canada, stating that they should be upright, honest, God-fearing men.

"With the insight of a scientist,
The skill of a surgeon,
The heart of a mother,
And the touch of an Angel."

I quote Dr. Edwards' admonition to young dentists in the hope that it may be an inspiration to those engaged in dental work for children or those who intend doing work along this line.

The McDowell County Dental Clinic was made possible by the work being done by the Jenkinjones Dental Dispensary demonstrating the work within McDowell County and creating sentiment in its favor.

It first being necessary to get a law passed by the Legislature authorizing a tax levy to finance the establishing and maintaining the Dental Clinic, Judge James French Strother, of Welch, West Virginia, drafted the bill which was introduced in the Senate by Senator William York and in the House of Delegates by Delegate William J. McClaren, of McDowell County. It passed both houses, with but one dissenting vote, which was in the House, January 24, 1919, and became a law with the Governor's approval on February 6, 1919, which law applies only to McDowell County, and authorizing the County Court to lay a levy of ten cents on the $100.00 property valuation, or 1/10 of 1% for the year 1919, 7½ cents for the year 1920, and thereafter each year five cents, or 1-20 of 1%. The law required that a vote be taken before it could become effective, and an election was held June 21, 1919, which carried by a good majority.

The actual work was begun September 15, 1919, with about four dentists on full time and ten on half time. The dentists working half time were those already located in the county. The full-time dentists were allowed to do private work in the evenings, the first year, but there was objection to this, and none of the dentists employed full time are doing any private work this year.

We started work with eight dental hygienists; one from New York, three from Boston, one from Washington, D. C., and the other three were trained at Maybeury, in the Jenkinjones Dental Dispensary.

The work began at different points of the county September 15, 1919. Twelve dentists and eleven dental hygienists being employed in the work.

Total operations for 11,280 patients first year 48,150.

This, the second year of our work was begun in August in the mountain districts, and due to favorable weather, we did the work thoroughly in all rural schools and are now making good headway in populous towns and villages. We have eight dentists on full time and six on half time; ten dental hygienists have been employed this year on full time.

Total operations for 13,000 patients second year 62,000.

I have not heard one complaint from any taxpayer, large or small; on the other hand, a number of coal companies have furnished rooms, water, light and heat free of charge; and when the clinics are not located in the school houses, some have built new buildings or remodeled old ones for the use of the Clinic, free of charge; in fact the support in every way given the dental clinic in McDowell County has been more than was anticipated, and I hope to show in a report including four years, something near the same results as in the case of the four years of school work at Maybeury, in the school dental clinic installed March 1, 1917, by Col. James Elwood Jones, general manager of the Pocahontas Fuel Company.

The clinic referred to is known as the Jenkinjones Dental Dispensary, and applied to the children of employees of the Pocahontas Fuel Company, under fourteen years of age. The majority of the children who were registered with the clinic were coal miners' children, and as they move from one coal works to another, only thirty out of forty-eight who were in the first grade remained in the Maybeury school. Some of them were children of the superintendents, mine foremen, office and store men, and skilled laborers; the balance were the children of coal miners.

With but one exception these children had badly-decayed teeth when we registered them March 1, 1917, and all had diseased tonsils but one.

Dr. E. F. Peters, surgeon for the Pocahontas Fuel Company at Maybeury, had charge of the medical inspection, and had the tonsils removed in four of the worst cases.

We cleaned their teeth twice a year; extracted several six-year molars the first year that had decayed to the nerves, or were abscessed, extracted all diseased temporary teeth and kept all cavities in the remaining teeth filled; gave the children tooth-brush drills and inspected their mouths often to ascertain if they were using the tooth brush. Prizes were given the first and second year for the cleanest teeth, best behaved, and general personal cleanliness. The result of this care of the teeth and mouth was that not one of these children missed a day of school on account of illness; not one contracted any contagious disease, with the exception of three who had slight attacks of influenza during the general epidemic which swept all over the country during 1918; not one was retarded or failed to make the grades; four of the number made two grades. The condition of their tonsils improved with no flare-ups of tonsilitis and from the appearance of these children we started with in the first grade and are now in the fourth and fifth grades, they are absorbing no poison and are healthy, normal, intelligent and well-developed children. According to the reports of the physicians at Maybeury we have reduced all diseases at the school 60%.

My conclusions, from my own observation are, that if the child is not allowed to sleep with its mouth open and its teeth taken in charge by a competent dentist and all cavities filled as fast as they appear, beginning at twenty-four months of age, that diseased tonsils will be eliminated. If you find a child with diseased tonsils who does not sleep with its mouth open that has no decayed teeth and keeps its teeth clean, you had better look for some hereditary constitutional disease. I began observing the relation of decayed, abscessed and unclean teeth to diseased tonsils in March, 1917, and firmly believe that decayed and abscessed teeth and unhealthy gums cause one-half of the diseased tonsils, and a large per cent. of the other half is caused by mouth breathing, whooping cough, diphtheria, scarlet fever and improper diet, all of which is preventable by the physician, dentist and rhinologist beginning with prenatal attention.

The results obtained by the service rendered the children of the employees of the Pocahontas Fuel Company by the Jenkinjones Dental Dispensary, at Pocahontas, Bossevain, Virginia and Carzwell Creek, Sagamore, Jenkinjones and Ittman, compare favorably with that of Maybeury.

I would be glad for any member of the dental society or medical profession to go with me to Maybeury during school hours and get the information from the children and school teachers at that place as to the results reported in this paper.

I commend the spirit of Dr. George C. Howard, second vice-president of the West Virginia State Dental Society in a most excellent address before the teachers' institute at West Union, West Virginia, December 3, 1920. I wish time permitted me to give you several extracts from his address, but one of the best is when he declares:

> "I am not in the Legislature for personal gain; I have no political aspirations but to tell you the truth, that I am serving the people of Doddridge County and State of West Virginia at an expense to myself over and above my salary, in the interest of the profession and the life and health of the boys and girls of Doddridge County and State of West Virginia."

Obviously, a school dental clinic is one of the most important factors in any community, when once established and the machinery put into operation, and I know of no way whereby same may be established, except by the tax levy or the generosity of some private citizen; but why should we sit idle and wait for some philanthropist who may yet be unborn, to extend this work that is needed *now?*

Almost every civilized country in the world is waking up to the fact that the health of the general public is the nation's greatest asset, and, as stated before, National health is simply community health, and the small amount of taxes it takes to conduct a dental clinic, aside from the humanitarian and economic standpoint will be returned to the taxpayer not in money but in far greater dividends; that is, the county and state will be repaid by reducing the number of inmates of the homes for incurables, insane asylums and all humane institutions. The industries will be repaid by having healthy young men to perform their work with 100 per cent. efficiency. The school fund will receive back part of what it has been paying out to educate backward children. The parents will be repaid by their children attaining manhood and womanhood, strong, healthy, perfect in face and figure as nature intended them to be, and better equipped to tackle the problems of life.

The National Government will be repaid, should the occasion ever arise to enter another war, on account of not having to reject by reason of defective teeth and resultant diseases caused by same, numbers of young men who would enter the service of their country, as was the case when drafting men for the recent World War.

If a cattle raiser has a cow that becomes infected with mouth disease or a hog that is infected with cholera, both the National and State Government send qualified men to his relief.

The loss of these animals means the loss of money to these individuals, and individuals, being an integral part of the Government, means a loss of money to the Government; hence many millions of the taxpayers' money has been appropriated to stamp out the diseases which cause the loss of cattle. While it is all right to spend money to stamp out the diseases of cattle, is it not all right also to spend money to stamp out the diseases of men and women?

Many counties of this state are building Memorial Buildings in honor of the forty-five thousand soldiers who gave their lives for the Government in France in the World War, which is commendable in the highest degree; but considering the fact that the records in Washington show that during the year that these brave and noble men lost their lives over seas, four hundred and fifty thousand children died in the United States, would it not be well to dedicate a few rooms of the space occupied by these Memorial Buildings to be used as a public health center, where headquarters of the Board of Health of each county, including school physicians, the school nurses, the school dentists, and dental hygienists, where all defective children could be treated throughout each year, whether the physical defect were teeth, tonsils, eyes, ears or any illness? Where expectant mothers could receive advice as to health rules and diet from those making this a study and where all parents could bring their children under school age for treatment?

Outside of the dental and medical professions there is no class of public servants who deserve more credit for the welfare of the present and future generations than the school teachers, and it is to our discredit that we pay so little for the great service they render our boys and girls.

The taxpayers cannot be sure of the welfare of their own children unless they are concerned with the welfare of the children who sit beside them in school. On these children and your children depend the future of this country. You cannot leave to haphazard, spazmodic alms givers, the duty that is fundamentally that of your local Government. You have good compulsory school laws, you have costly machinery for mental advancement, but the city or county who has not medical and dental clinics is failing to build a physical foundation upon which mental progress must be based.

At the present session of the legislature a law was passed, approved and signed by the Governor, April 7, 1921, making a permanent tax levy of ten cents on the $100.00 valuation. (The text of this law is published in the JULY DENTAL SUMMARY.—*Editor*).

BOOKKEEPING IN DENTISTRY

G. A. GRAHAM, D.D.S., LAPEER, MICH.

(Written for THE DENTAL SUMMARY)

THE PURPOSE OF BOOKKEEPING in Dentistry in my opinion should be *first*, the education of each patient to preventive dentistry instead of emergency service. The greatest mistake of the dental profession is in spending energy and time, and the time and health of patients, in attempting to repair teeth that are so badly decayed, crown broken down, and nerve exposed or infected, that it is always questionable whether the most skilled and experienced dentist could continue the usefulness of such teeth without great risk to the physical welfare of his patient.

Too many dentists are doing only emergency service and are wondering why they are not successful. In order that any dentist be a success he must see the defects that are just starting and advise and insist on his patients having these conditions remedied.

It is my opinion that most dentists overlook and neglect the small cavities and minor health conditions of the soft tissues of the mouth, because they haven't accessible an adequate examination-sheet on which to enter their findings, and one from which the dentist will be able to explain to the patients to the latter's satisfaction, the services they need to put the mouth in as near 100% physical condition as the professional skill of the dentist can do it. This, to my mind, is preventive dentistry.

I find in the small town in which I practice that at least seventy-five per cent. of our patients appreciate having all of the minor cavities and unhealthy conditions of the soft tissues put in a good, healthy condition. After I have examined the patient's mouth thoroughly, explained to him what services he needs, and agreed upon the fee for such service, I find it good policy to make as many appointments as will complete the service and make them as close together as the treatment will allow. In this way the work is not dragged out over a long period of time and compensation for services comes when they are finished. In this way I keep away from attempting to handle too many patients which will be a detriment to any practice, because a certain amount of time is lost in dismissing and receiving patients and in arranging proper instruments for each case. At least one hour should be allowed to each patient, and in a large number of cases two hours, where there is considerable service to be rendered.

If your practice has dropped off fifty per cent. because of the financial depression, the proper use of such an examination sheet should increase your selling effort seventy-five per cent., and a dentist using such a sheet will come through as if there were no depression and his efforts will shorten the period of depression. Business will be great if you will try to sell every patient a mouth that is 100% physically fit.

Second, the purpose should be to show the practitioner what per cent. of his gross receipts it is costing him to do business. From personal conversation with a number of dentists in different states, I have learned that it is costing them as high as fifty per cent. of their gross receipts to practice dentistry. This is a deplorable condition. Any dentist's expenses should not be over thirty per cent. of his gross income, and he should be watchful to make it even lower than this if he doesn't have to slight the physical welfare of his patients in so doing.

Third, the bookkeeping system should include adequate parts for a day-book which will be the original book of entry. On this should appear the name of each patient handled in one day, together with a description of the services rendered each patient; this record the dentist should write himself. Also there should be a place to record the teeth or tooth that was worked upon; also a place to keep a record of the time spent in operating, because in this way one can determine an adequate price for treatments and prophylaxis as well as for mechanical work. A place for fees and receipts should not be overlooked and a place for incidental expenses which will come from the cash.

A summary of the professional service and financial record for each patient on the day-book should be made on the patient's personal record. This should be well taken care of to see that it balances when your services are finished, with the examination and the estimate you gave the patient before you started the service for him.

A part should be included which will keep your patients coming back to your office at regular intervals for examination and prophylaxis. This they will recognize as a personal favor, and you will be filling cavities and treating conditions before they get into questionable stages.

A dentist should keep a record of his laboratory work, especially a number of cases in all kinds of technic, in order to determine the average time it takes him to do the work, and the average amount of expense for materials. In this way he will receive compensation for laboratory work as well as for service at the chair.

Every dentist will find it profitable to have a ledger which will take care of all expense, both office and personal, keeping them separate; also showing a summary of bank account and totals of the day-book. These records should be totaled for each month and for the year.

Such a system of keeping books will afford the dentist a history of services rendered patients, together with his financial standing with patients and all other firms or people with whom he has any financial transaction. Such keeping of books will tend to diminish the shopping in dentistry. The dentist will have personal information as to what an adequate charge for his services should be. It will show his patients that he is a business man as well as a professional man. He will have the personal satisfaction at all times, even years after the services have been rendered, of knowing, and having accessible more history of the service for the patient than the patient himself.

People expect to pay the dentist for his services the same as they they do the merchant, tradesman, and lawyer. The fault for not receiving compensation for services is the direct fault of the dentist personally. Such keeping of books will be profitable to the dentist, to his family, to his patients; also it will help to elevate dentistry and will make it possible for the dentist to pay his bills when due.

There are a number of systems of bookkeeping on the market which are efficient, any of which will benefit your practice, and make of you a better business man.

CLINICAL CARE OF THE TEETH OF CHILDREN

BY DR. TRIM HOUSTON, CORSICANA, TEXAS

(Written for THE DENTAL SUMMARY)

IN VIEW OF THE REFERENCE made recently by Dr. Kells in a paper published in the *National Journal*, as to the value that might accrue from a series of tests to be made over a period of time in order to try out the efficiency of the various and sundry kinds of dentifrices, it may be that a recital of work done along this general line over a period of years, may be of interest.

In 1907, as the dentist to an Orphans' Home,—in order to put into effect an absolute control over and responsibility for the mouth-condititions of the children—I was put on a salary. No one else was to have any say as to what attention the children should receive, or when they should be seen. That agreement still holds good—a little over fourteen years.

My orders were, and are, that the children have brushes, water and salt; no pastes, powders or mouth washes. The most hearty cooperation of everyone connected with the Home has been received during the entire time.

The work was undertaken when there were about 125 inmates, now about 350. During this time 520 have been discharged from the Home. They are taken in at any age up to 16, and supposed to receive their discharges between 18 and 19 years.

Below is a tabulation of the attention received by 477, this being the number who were inmates for two years or more. The records of those in for a less time are not used as they were not with us long enough to test out our method of caring for them. Counting from this two-year period:

Number of children	477
Number of children needing only prophylaxis	213
Number of children needing other attention	264
Number of children needing fillings	231
Number of children needing only extractions	33
Number of fillings	501
Number of approximal fillings	38
Number of occlusal and buccal fillings	463
Number of labial or lingual fillings	None
Number of nerves killed	4
Number of permanent teeth extracted	3

When we remember that these are all children of whom the father, and sometimes the mother too, died before the normal time, with a large percentage of tubercular and kidney affections, a few syphilitic, we can expect their constitutions to be below normal; with their teeth more easily affected than the average.

With the record made in spite of this handicap—comment should not be necessary as to the value of regular brushing; prophylactic treatment as often as indicated; all cavities seen to as soon as found; regular wholesome meals with the absence of tid-bits between time, and the lack of the real need of anything other than the mechanical cleaning of the teeth.

FUNDAMENTALS OF OPERATIVE DENTISTRY

BY W. H. O. McGEHEE, M. D., D. D. S., CLEVELAND, OHIO

LATE PROFESSOR OF OPERATIVE DENTISTRY, DENTAL PATHOLOGY AND THERAPEUTICS, AND SUPERINTENDENT OF CLINICS IN THE DENTAL SCHOOL OF WESTERN RESERVE UNIVERSITY.

PERIODONTIA

TERMINOLOGY, CLASSIFICATION, CAUSES OF PERICLASIA, SYMPTOMS, DIAGNOSIS, PROGNOSIS AND TREATMENT OF PERIODONTAL DISEASES.

BY PERIODONTIA is meant that branch or specialty of dentistry which is concerned with the prevention and treatment of periodontoclasia. The term periodontoclasia is derived from the Greek words *peri*, around, *odons*, a tooth and *klan*, to break. The term is used to designate a disease process which produces or tends to produce a breaking down or destruction of the tissues surrounding the teeth, viz., the gums, pericementum and alveolar process. Conditions of this nature have been previously designated as pyorrhea alveolaris, interstitial gingivitis, alveolitis, suppurative alveolitis, phagedenic pericementitis, Rigg's disease, hematogenic calcic pericementitis, gouty pericementitis, and chronic suppurative pericementitis. A synonym for periodontoclasia, occasionally used for the sake of euphony, is "periclasia." One who specializes in the treatment of these conditions is known as a "periodontist," while the study of the diseases of these tissues is sometimes known as periodontology.

For an intelligent conception of this subject it is first necessary that the reader familiarize himself with the terminology or nomenclature, for an outline of which the writer is greatly indebted to Dr. J. Oppie McCall, of Buffalo, N. Y., a member of the Council of the American Academy of Periodontology. The following terms and definitions are now used by this organization, and will undoubtedly soon become a recognized part of the nomenclature of the profession.

TERMINOLOGY

Marginal Gingiva. That portion of the investing tissue which lies in contact with the enamel, but which is not attached directly to the tooth surface.

Cemental Gingiva. That portion of the investing tissue which is attached to the cementum, but which lies crownwise of the alveolar process.

Alveolar Gingiva. That portion of the investing tissue which overlies the alveolar process, and which is so firmly attached to its surface as to have but slight mobility.

Areolar Gingiva. The tissue overlying the alveolar process, and which is bound to it by a loose areolar connective tissue.

Labial and Buccal Mucosa. The mucous tissue beyond the areolar gingiva on labial and buccal surfaces. On lingual surfaces it is known as the "palatine" or "sublingual mucosa," as the case may be.

Alveolar Mucosa. The mucous tissue overlying the ridge formed after tooth extraction.

Gingival Crevice. The crevice formed by the contact of the marginal gingivæ with the tooth surface.

Ula. A synonym for gingiva.

Periodontium. The investing tissues of the teeth, including gingivæ, pericementum, and alveolar process.

Gingivitis. Inflammation of the gingival tissue.

Recession, or Ulatrophy. A form of periodontoclasia characterized by a diminution in the bulk of the marginal and cemental gingiva, with exposure of the cementum.

Alveoloclasia. An absorption of the inner wall of the alveolus, which does not necessarily involve a corresponding destruction of the pericementum. It results in tooth mobility.

Pericementoclasia. Disintegration of the pericementum and alveolar bone without corresponding loss of overlying gingival tissue. It results in pocket formation.

Periodontal Abscess. An infection of the periodontal tissues whose inflammatory exudate drains elsewhere than through the gingival crevice. It is divided into *periapical* (of pupal origin), and *parietal* (of extra-pulpal origin).

Disocclude. To grind or treat a tooth or its restoration so that it does not meet its antagonists of the other jaw in any of the movements of mastication; required temporarily for very loose teeth.

Centric Occlusion. The relation of the inclined planes of the teeth when the jaws are closed in the position of rest.

Eccentric Occlusion. The relation of the inclined planes of the teeth when the jaws are closed in any of the excursive movements of the mandible. This term is a substitute for articulation.

Traumatic Occlusion. An abnormal occlusal stress which is capable of producing, or has produced, an injury to the periodontium.

Hoe Scaler. A scaler having a single cutting edge, the blade being turned up at approximately a right angle to the shank.

Curette Scaler. A scaler having two cutting edges approximately parallel to the shank.

Apoxemena. The group of substances to be removed from a pocket in the treatment of pericementoclasia. These substances include: Calculus, pus, disintegrated soft tissue elements, food debris, necrotic pericementum, and the outer layer of the cementum. Derived from the Greek verb *apoxeo*, to shave away; to cut off; to smooth; to plane, scrape or polish.

Apoxesis. The act of removing apoxemena from the periclasial pocket and rendering denuded cementum smooth.

Curettage (synonym for apoxesis). A surgical operation for rendering the cementum surface mechanically compatible with the overlying gingival tissue.

Deposit. Hard or soft material adherent to the tooth surface.

Concretion. Synonym for deposit.

Detritis. Hard material adherent to the tooth surface, or disintegrated tooth substance.

Debris. Soft foreign material loosely attached to the tooth surface.

Scaling. Removal of concretions from the visible tooth surface and that part of the surface covered by the marginal gingiva or its equivalent

CLASSIFICATION OF THE DISEASES OF THE PERIODONTIUM

The diseases of the periodontium with which we are concerned in a study of periodontoclasia are of five different types and may be classified as follows, viz:

First, recession of the gums (ulatrophy).

Second, gingivitis.

Third, alveoloclasia or alveoclasia.

Fourth, pericementoclasia.

Fifth, periodontal abscess (periapical and parietal).

The various forms of periapical abscess have been previously discussed, and one variety of perietal abscess was described as pericemental abscess in the previous chapter; consequently we are here concerned with a consideration of the causes, characteristics and treatment of the four other types mentioned. With the exception of recession, these forms of periodontoclasia are seldom seen as pure types, but usually occur as fusions of two or more of the varieties mentioned. They are usually so intermingled that the typal lines are more or less indistinct, each case presenting a different appearance. However, by keeping in mind the anatomy of the parts, noting the tissues affected and the characteristic symptoms exhibited in these tissues, each case may be analyzed into its basal type.

CAUSES OF PERIODONTOCLASIA

The various forms of periclasia are produced by similar causes, the different types resulting from variations in the degree or amount of the stimulus, the relationship of the combinations acting together and the character and resistance of the tissues acted upon. Reference to the excellent chart of Dr. J. Oppie McCall, to whom acknowledgment is herewith extended for permission to insert it in this work, reveals the fact that these causes may be divided into *primary* and *secondary,* or predisposing and exciting. The primary causes are exciting, while the secondary causes are largely predisposing in character.

Primary Etiological Factors. The primary or exciting cause is usually a localized mechanical irritation in some form. This irritation may produce injury to the marginal, cemental or alveolar gingiva, to a portion of, or to the entire pericementum, or it may act on the alveolar crest.

Prominent among the numerous forms of mechanical irritation producing these conditions are:

A Traumatic occlusion, resulting from malocclusions of the teeth; habits of occlusion; defective restorative operations on the part of the dentist, such as fillings, crowns, impinging saddles and facings, ill-fitting clasps, etc., or from congenitally abnormal tooth forms.

B Faulty orthodontic procedures, such as too rapid regulation of the teeth, imperfect fixation, impingement of appliances on the soft tissues, etc.

C Local irritants, such as salivary and serumal calculus, food debris, materia alba (Black), abnormal saliva, rough gingival enamel surfaces, and cervical caries.

D Extra-oral trauma, produced by food impactions as a result of faulty contact points, incorrect habits of brushing the teeth, or improperly-formed brushes.

Secondary Etiological Factors. The secondary causative factors are largely predisposing in character, and may be either local or systemic, or both. Prominent among these are:

A Abnormal systemic conditions, largely diseases of suboxidation, resulting in lowered cell vitality of the periodontium, from deficiency in the quality or quantity of the blood supplied to the parts; lymphatic insufficiency (local); and excretory insufficiency (general).

B Other nutritional disturbances, such as functional insufficiency of the parts, general hereditary tendencies, neurosis, non-occlusion, and insufficient tooth-brush massage.

C Chemical irritation, as a result of the action of bacteria, producing bacterial toxins and decomposition products of foods in the mouth; also from the action of organic poisons, such as the intestinal amins, alcohol, etc., or of inorganic poisons, prominent among which are mercury and phosphorus.

D Local conditions in the mouth, such as epithelial defects in the gingival crevice, frail osseous support to the teeth and soft tissues, mouth breathing, and other injurious habits.

For the production of the various types of periodontoclasia, combinations of the above-mentioned causes are necessary. It is now thought that some form of local irritant is necessary in the majority of instances to produce these conditions, this belief being contrary to previously-accepted theories that certain types were largely of systemic origin and could originate in the absence of local causes. The trend of modern thought among periodontists is that systemic conditions only lower the cell vitality of the parts, thus rendering them more susceptible to the local attacking agencies, and are thus secondary in importance as causative factors. This attitude is, however, still disputed by many excellent authorities. It also is claimed by Thomas B. Hartzell that the streptococcus viridans is essential to the production of the combination of those types known and previously recognized under the name of pyorrhea alveolaris, and that all other causes are secondary. Other authorities are equally firm in the belief that spirochete are specific to the latter type of these diseases.

RECESSION OF THE GUMS

Recession of the gums is a condition in which there is a diminution in the bulk of the marginal gingival tissue and underlying alveolar crest, resulting in exposure of the cementum of the root. Usually, in its pure form, there is no redness, swelling, pain or other symptoms of inflammation present. It is claimed that in many instances it is a normal, physiological absorption due to age, as a result of atrophy of the underlying crest of the alveolar process. It also is frequently due to faulty use of the brush on prominent tooth surfaces. Other cases are due to faulty or meager blood supply, to thin overstretched areas of gum tissue, or vitiated, thickened blood supply, incapable of adequate circulation through the capillaries of the part. The condition also is due occasionally to faulty operative or orthodontic procedures.

Recession, in its pure type, is most frequently found over the cuspids, the central incisors, the buccal roots of molars, and teeth standing prominently in the arch. Traumatic occlusion is frequently present and invasion by bacteria, with infection, usually absent. The treatment consists in the removal of the cause and stimulation of the circulation of the parts through proper massage, correct methods of brushing and proper functioning in mastication. Systemic medication will be of value in cases where faulty metabolism is concerned in the production of vitiated blood streams.

GINGIVITIS

The term "gingivitis" is used to designate any inflammatory state of the gum tissue. There are numerous varieties, such as acute and chronic, hypertrophic, indolent, acute ulcerative, or Vincent's gingivitis.

The general causes of gingivitis may be mentioned as follows, viz.:

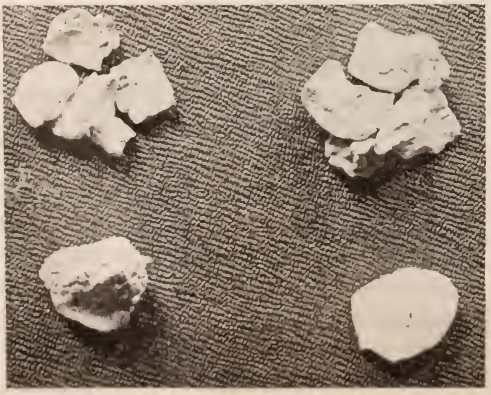

Fig. 315

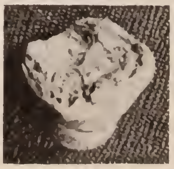

Fig. 316

Fig. 315—Salivary calculus.
Fig. 316—Large mass of salivary calculus.

First, Local Mechanical Causes. Salivary calculus (*Figs. 315, 316, 317, 318 and 319*); improperly-finished fillings, crowns, plates and bridges; rough gingival cavity edges; improper use of toothpicks and floss silk; irritation of tooth-brush bristles, fragments of toothpicks, bones or oyster shells; pieces of rubber dam or ligatures left in position; injuries inflicted by separating materials or appliances, wedges, clamps, ligatures, orthodontic appliances; improper contact points, resulting in food impactions; tooth eruption; and excessive use of stiff brushes.

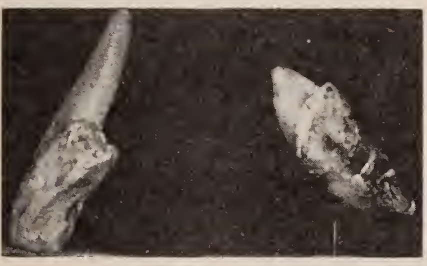

Fig. 317

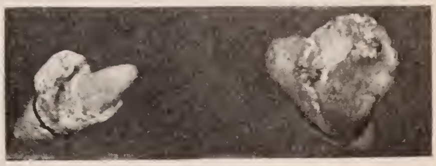

Fig. 318

Fig. 317—Salivary calculus deposited on the teeth.
Fig. 318—Deposits of salivary calculus on the teeth.

Second, Local Chemical Causes. Fermentation and putrefaction of food debris; bacteria; excessive use of tobacco, alcohol, astringent washes; strong acids or alkalies.

Third, Systemic Causes. Drug or metal poisoning; auto-intoxication; acute infectious diseases; faulty metabolism, lowering the resistance of the tissues.

Chronic Gingivitis. The chief characteristics of chronic gingivitis are redness, swelling, sensitiveness or pain, usually confined to the marginal and cemental gingiva, the alveolar gingiva remaining normal in color and contour. The crest of the marginal gingiva is rounded or everted, there being, however, no exposure of cementum. Slight pus formation may manifest itself in the presence of infection. In many cases pus formation is absent. There usually is very little, if any, absorption of the alveolar crest, and no pocket formation. Chronic gingivitis, if not corrected, often leads to deeper destruction of the periodontal tissues.

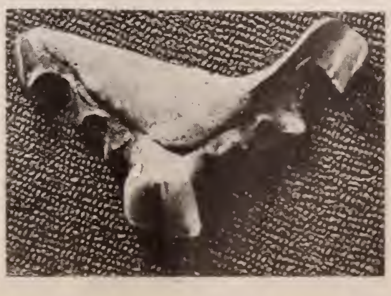

Fig. 319—Large deposits of salivary calculus on lower denture.

Hypertrophic Gingivitis is a form of chronic gingivitis in which hypertrophy of the tissues is present, together with the additional symptoms previously mentioned. In this type the gum color is frequently very slightly redder than normal.

Indolent Gingivitis is another form of chronic gingivitis characterized by the bright red color of the gingiva, in contra-distinction to the purplish red found in ordinary cases, and the presence of more painful manifestations. The general tone of the tissues is below normal, and they do not respond readily to treatment.

Treatment of Chronic Gingivitis. The following is a brief outline of the treatment of these conditions.

First, remove the cause, if possible, whether mechanical, chemical or systemic.

Second, give the patient thorough prophylactic treatment.

Third, prescribe mild antiseptic mouth washes and regular hygienic local cleansing methods.

ACUTE ULCERATIVE GINGIVITIS

Synonyms. Phagedenic gingivitis, ulcerative gingivo-stomatitis, Vincent's gingivitis, "trench mouth."

This disease is an infective, ulcerative inflammation, usually appearing in the form of grayish, yellow sloughs on the labial, buccal, lingual or proximal portions of the crest of the marginal gingiva, surrounded by bright red inflammatory areas. It may appear as a line around several teeth, or as larger sloughing areas affecting many or all of the teeth of the denture. The infection involves the superficial tissues largely, and does not exhibit recession or pockets, unless these symptoms have preceded the attack. The teeth and gums are markedly tender to touch, and hemorrhages are frequent. Pus formation usually is absent in the pure type of this disease, but fetid breath is a prominent manifestation. The condition may be preceded, accompanied or followed by Vincent's angina. There is often increased salivation, loss of appetite, insomnia, low fever, and general malaise.

"Trench mouth" recently was brought prominently to the attention of the profession during the great world conflict, when it became quite prevalent in the mouths of soldiers, owing to poor hygienic conditions in the trenches. The *immediate cause* of the disease is an infection of the tissues by Vincent's fusiform bacillus and spirochete. *Contributory factors* are the presence of mechanical and chemical irritants, together with lowering of the tone of the affected tissues. Cigarette smoking also has been mentioned as a predisposing cause. It also is found in the mouths of syphilitics. In doubtful cases, diagnosis should be made by obtaining a smear or culture and subjecting it to microscopic examination for the Vincent organisms.

Treatment. No attempt at scaling and other prophylactic procedures should be resorted to until the sloughs have first been removed and the marked infection greatly reduced, because of the danger of producing deeper secondary infection of the parts, as well as on account of the great pain present. At first, the mouth is swabbed with sterile gauze or cotton and as much as possible of the membranous exudate carefully wiped away. The tissues are then forcibly sprayed with warm, normal saline solution, one per cent. solution of hydrogen dioxid, or sodium perborate, one teaspoonful in a half glass of warm water. The affected areas are now isolated with napkins, dried, and an application of Churchill's tincture of iodin is made by means of an applicator, allowing it to flow by capillary attraction along the crest of the gingiva. A ten per cent. solution of silver nitrate is then applied to the still fluid iodin and allowed to remain for half a minute, when the parts are forcibly flushed with the spray bottle. The application of these agents results in the formation of a bright yellow precipitate of insoluble iodid of silver. The sodium perborate solution is prescribed to be used at intervals of half to one hour until disappearance of the ulcers, when it may be used three or four times a day for several weeks. The patient should be seen at least once a day, and the local treatment repeated until subsidence of pain and excessive ulceration indicate marked diminution of the infection, when scaling operations may be resorted to, (usually at the end of two or three days), all sources of irritation removed, and the mouth placed in as nearly a cleanly condition as possible. The microscope usually will reveal marked diminution of the Vincent's organisms at the end of a few days, if the treatment outlined is carefully followed. The case should be seen at increasingly longer intervals and kept under observation for several months. The patient should be given thorough instructions as to the importance of absolute cleanliness of the mouth throughout the period of treatment.

Other medicinal agents which have been recommended as local applications are trichloracetic acid, ten per cent. solution, followed by saturated solution of sodium bicarbonate; mercuric cyanid, one per cent. solution; powdered sodium perborate; and chromic or lactic acid. In addition to the solution of sodium perborate, other mouth washes mentioned by various writers as of value for use by the patient are hydrogen dioxid, one per cent. solution, potassium chlorate, saturated solution, Dobell's solution, warm salt water, or the following prescription:

℞. Liq. potasii arsenitis........ʒI
Liq. antiseptici alk..........℥III

M. Sig. One teaspoonful in a half glass of warm water.

In addition to the local treatment, proper elimination should be stimulated by use of cathartics, the diet should be regulated, smoking should be discouraged, and, in the extensive cases, rest in bed should be insisted upon.

ALVEOLOCLASIA

This form of periodontoclasia is characterized by an absorption of the bone of the alveolus, resulting in mobility of the tooth in its socket. It seldom occurs as a pathological phenomenon in pure type, except as a temporary result of faulty operative or orthodontic procedure, it usually being intermingled with other types. Recession of the marginal gingiva is frequently present as a result of the absorption of bone, although the usual symptoms of inflammation, such as redness, tenderness, etc. frequently are absent. There is usually no severing of the fibers of the pericementum, and infection, pus, and pocket formation are absent.

The condition is most frequently the result of traumatic occlusion. It also occurs in cases of non-occlusion, congenital or otherwise, being in these cases a form of atrophy from disuse. Frail osseous support and conditions of faulty metabolism may largely accentuate the tendency to its production.

The *treatment* consists in prevention or removal of the cause, restoring proper occlusal relationships, and general stimulative measures, through proper massage, toning up of the parts, and physiological functioning of the affected teeth.

PERICEMENTOCLASIA

This form of periclasia is characterized by the formation of a pocket, owing to severance of the penetrating fibers of the peridental membrane, and is nearly always suppurative in character. The marginal gingiva is thickened and its crest blunted, but there is no apparent loss in bulk of the gum tissues, nor is there deepening of the gum color to any marked degree. The passage of a probe along the side of the affected root reveals a pocket or follicle of varying depth, and deposits of serumal calculus, with, as a rule, no exposure of underlying bone. Absorption of alveolar bone slightly precedes the severance and breaking down of the fibers of the pericementum, thus accounting for the usual lack of bone exposure. Pus is present in varying amounts and may be readily apparent, or be squeezed from the pockets, on pressure. In the pure form there is lack of abnormal mobility of the tooth, very little if any pain, and no fever. However, if the condition be associated with recession, gingivitis, or alveoloclasia, the characteristics of these disturbances may be added, together with gingival abscess formation and marked destruction of the periodontal tissues. (*Figs. 320 and 321.*)

It must be remembered that the symptoms mentioned in connection with the various classes of periodontal disturbance are those characteristic of pure types and that these are rarely found. Usually combinations of two or more of these types are seen, and especially so with pericementoclasia. In these cases the disease is diagnosed as true pericementoclasia, the other phenomena being considered secondary.

Causes. The *primary causes* are traumatic occlusion, and impaction of food The *secondary causes* are serumal calculus, pus-forming micro-organisms, lowered cell vitality, and the disturbances producing it, organic and inorganic chemical irritants.

In general, the *treatment* of this type consists in the removal of the causes, local and systemic, destruction of the infection, thorough prophylactic treatment, and the obtaining of the co-operation of the patient in regular and systematic cleansing operations.

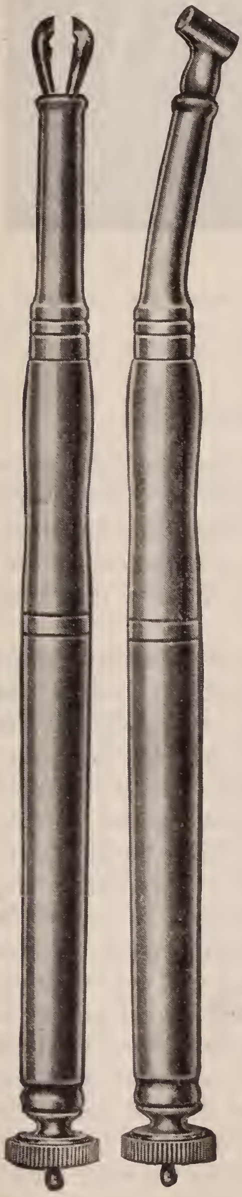

Fig. 322—Porte polishers for carrying wood point in prophylaxis work

DIAGNOSIS AND PROGNOSIS OF PERIODONTOCLASIA

The principal difficulty encountered in the diagnosis of periodontal disease is the commingling or blending of types. In making a diagnosis, the existing causes should be considered carefully and the morphology of the affected parts recognized. The final decision is based on a thorough knowledge of the etiology and symptoms previously mentioned. Keeping in mind the anatomy of the parts, and determining which tissue is affected, noting the presence or absence of inflammation and pus formation usually will enable the operator to come to a decision as to the predominating type, when the case should be so diagnosed. The use of a blunt probe is of value for determining the depth of the gingival crevice and existence or absence of pockets. Resort to the microscope for determination of the type of infection frequently is important.

The prognosis of these conditions is most favorable under the following circumstances, viz.:

First, high tissue resistance, or cell vitality.
Second, teeth with good appr oximal support
Third, normal occlusal relationships.
Fourth, healthy condition of the periapical tissues.
Fifth, minor involvement of the alveolar bone and pericementum, and slight exposure of cementum.
Sixth, conscientious and intelligent co-operation of the patient.

Seventh, expert, scientific, professional service on the part of the operator.

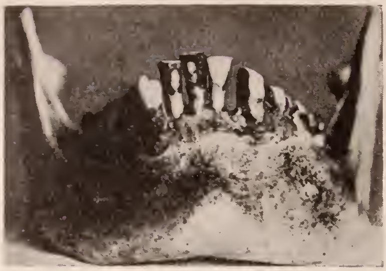

Fig. 320

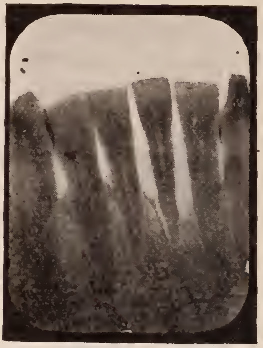

Fig. 321

Fig. 320—Destruction of bony tissue from an advanced case of periodontoclasia (pyorrhea alveolaris).

Fig. 321—Advanced absorption of bone surrounding the lower anterior teeth in a case of periclasia.

GENERAL TREATMENT OF PERICLASIA

The tendency in modern practice is to discard the use, by the operator, of irritating and caustic medicaments and of strongly antiseptic or astringent dentifrices by the patient, and rather to depend on nature to repair the damage done, after thorough eradication of the cause. This idea is in line with the recent trend of thought and practice in medicine and surgery.

The *local treatment* consists in the thorough scaling and polishing of affected teeth and roots, by means of suitably-shaped scalers of either the plane or curette type, and wood points and polishing materials. (*Fig. 322*). During the prophylactic work, the parts should frequently be subjected to a spray of warm saline solution under high pressure. Healing should be stimulated, in case of pockets, by the formation of a blood clot. The removal of all hopelessly-diseased teeth and roots, as well as faulty crowns, bridges, and prosthetic appliances, should be accomplished at once. Since traumatic occlusion is one of the most prominent causes of these pathological disturbances, it should be corrected early, testing the teeth in both centric and eccentric occlusion, and grinding until the use of carbon paper will reveal proper relationships of opposing teeth. Success consists in the diagnosis and removal of all contributory causes, the eradication of infection, and improving the tonicity of the parts. In cases of marked destruction of bone and soft tissue involving less than one-half of the root, Dr. Arthur D. Black advocates surgical eradication of the pockets by turning back a gum flap, chiselling away the affected bone and suturing back the overlying soft tissues, where necessary.

The *systemic treatment* consists in improving the general health standards and removing the constitutional contributory factors, if necessary through the co-operation of a physician.

Co-operation of the Patient. Very little can be accomplished in the way of permanent results without the intelligent and conscientious co-operation of the patient. Properly-constructed brushes should be prescribed and definite instructions given as to their method of use, the "rolling stroke" method seeming to take preference over all others among the members of the American Academy of Periodontology.

REPORT OF THE COMMITTEE ON DENTAL SCIENCE AND LITERATURE

CALIFORNIA STATE DENTAL ASSOCIATION

DR. F. V. SIMONTON, SEC.

(FOR THE DENTAL SUMMARY)

CHEMISTRY, DENTAL PATHOLOGY AND HISTOLOGY

By Dr. John A. Marshall

"Diet, Calcium Metabolism and the Teeth."—C. F. Rumsey, *British Dental Journal,* January 15, 1921, pages 49-54.

The author takes exception to some of the points in Dr. Broderick's paper which was abstracted in this section last month. Dr. Ramsey says it is not apparent that the endocrine system constitutes the beginning and the end of dental troubles, although it undoubtedly plays an important part. Faulty diet is perhaps the more important factor of the two.

The author states that the present practice of the flour industry in preparing wheat and similar grain for flour is such that some of the most important elements in the raw product are lost. For example, although grain contains an appreciable quantity of vitamins, the ordinary patent flour is very deficient in its content of these accessory food factors. Another important dietary substance which is almost wholly removed is cellulose. This lack of cellulose from the finished product is responsible for two results. *First,* the teeth are not called upon to perform normal mastication, because it is not necessary to chew the fiber. As a result—"the beneficial effect of attrition as a stimulus to the pulp is lost in addition to its effect in making the teeth self-cleansing." By this lack of mastication the musculature and bony growth do not develop to the normal degree. A cellulose-free diet is also partly responsible for the prevalent condition of chronic constipation. The function of cellulose is to provide bulk to the stool, and in this manner to stimulate peristalsis. When this normal stimulus is lost, the bowel suffers accordingly.

It is stated that salivary digestion is favorably affected by sodium chlorid and mention is made of the universal desire for salt when eating carbohydrate food, as potato. The author explains this on the ground that salivary activity must be increased by the sodium chlorid.

The relationship of fats to calcium metabolism is next discussed. The importance of olive oil, butter, and bacon fat, as articles of diet is explained from the standpoint of the relative content of saturated and unsaturated fatty acid. For example, olive oil contains a relatively large amount of unsaturated fatty acid, while margarine on the other hand is not so desirable because it consists largely of saturated fatty acids. The system exhibits greater ease in absorbing the former than the latter.

Both Dr. Ramsey and Dr. Broderick agree on the hypothesis that calculus is "a sign and symptom of excess of lime salts in the body, and as the blood is the agent for carrying the lime salts to the tissues, serumal calculus is as likely to be deposited *as the salivary variety.*"

"Condition and Characteristics of the Dentition of the Nicobarese" (J. Warwick Hele, *British Dental Journal*, January 1, 1921, pages 1-4). Three case reports and a brief discussion of diet and habits constitute the basis for sweeping generalizations upon the oral conditions of this tribe.

"The Hess Method of Demonstrating the Extent and Variety of Root Canals" (J. B. Parfit, *British Dental Journal*, January 1, 1921). The author describes a method of demonstrating irregularities of pulp canals by filling them with unvulcanized rubber, and subsequently vulcanizing the specimen. After vulcanization the tooth is dissolved in hydrochloric acid, and the vulcanized model of the root canals and pulp chamber remains.

MISTAKES IN THE INTERPRETATION OF DENTAL RADIOGRAMS

By. Dr. Leland E. Carter, San Francisco

One of the important requisites in the interpretation of dental radiograms is a thorough knowledge of the errors to be avoided. Forewarned is to be forearmed, and to be familiar with the pitfalls of interpretation means the avoidance of many costly mistakes.

With this idea in mind, we offer a list of 82 possible mistakes in the interpretation of dental radiograms. Forty-one of these mistakes are taken from "Elementary and Dental Radiography," 2nd Ed., by Howard Riley Raper, D.D.S., and the remainder from an article by Dr. Raper reprinted in the April, 1921, *Dental Record* from *Oral Hygiene.*

1. To mistake the mental foramen for an abcess cavity at the apex of a lower bicuspid.
2. To mistake the anterior palatin foramen for an abscess cavity.
3. To mistake the nasal cavity for necrosis of the palate.
4. To mistake the maxillary sinus for an abscess cavity at the apices of of the upper bicuspids and molars.
5. To mistake the inferior dental canal for a fistulous tract.
6. To mistake the mandibular foramen for osteoporosity, due to disease.
7. To fail to bear in mind that there is such a thing as a normal periapical space.

8. To mistake a dark spot, due to somewhat unusual porosity, for an alveolar abscess.

9. To mistake a shadow caused by the spinal column for necrosis of the mandible.

10. To mistake the lingual tubercle for a bone whorl or the shadows on either side of the lingual tubercle for osteoporosity due to infection.

11. To mistake the hyoid bone for "some" pathologic lesion.

12. To mistake the larynx for an abscess cavity in the neck.

13. To make a diagnosis of antral empyema because one antrum happens to be smaller than the other.

14. To mistake the coronoid process for the root of a third molar.

15. Without taking into account the angle at which the X-rays were directed toward the tooth and film, to assume that a canal filling does not reach the apex of a root when it does.

16. Without taking into account the angle at which the X-rays were directed toward the tooth and film, to assume that the buccal roots of upper bicuspids and molars are much shorter than the lingual roots of the same teeth.

17. To assume that a perforation through the side of a root does not exist because it cannot be seen to the mesial or distal.

18. To assume that a broach is following a canal because it cannot be seen extending too far to the mesial or distal.

19. To mistake a canal filling passing into a crooked root for a canal filling material passing through a perforation through the side of the root.

20. To state definitely from the appearance of flat radiographs (not stereoscopic radiographs) that impacted teeth lie to the lingual or facial of the other teeth.

21. To mistake a small cervical filling for a pulp stone.

22. To assume that a filling in the crown of a tooth enters the pulp chamber when it does not.

23. To assume, from the appearance of flat radiographs (not sterescopic radiographs) that the root of an upper posterior tooth penetrates the antrum.

24. To fail to take into account that an abscess cavity may lap to the lingual or facial of the adjoining teeth giving the radiographic appearance of their involvement but without involving them.

25. To fail to consider the element of depth when judging the size of an abscess cavity.

26. To mistake normal resorption of bone, due to age, for pyorrhea alveolaris.

27. To fail to take into account the effect the tipping of a tooth to the lingual or labial will have on the appearance of the tooth in the radiograph.

28. To state *definitely* that a rarefied area at the apex of a root rep-

resents infection without considering the anatomy of the parts and the symptoms and history of the case.

29. To state that no infection exists because no abscess cavity can be observed.

30. To fail to bear in mind that osteodensity as well as osteoporosity may be caused by infection.

31. To assume, when observing an abscess cavity at the apex of a tooth with a well-filled canal, that the abscess occurred after the canal filling.

32. To expect to see a fistulous tract.

33. To give a positive diagnosis of pulp stones from the appearance of one radiograph.

34. To try to make one radiograph do the work of two or several.

35. To mistake hypercementosis for a poorly-made radiograph.

36. Not to know the difference between a good radiograph and a poor one.

37. To make just one radiograph of a part and stop, calling it a radiographic examination.

38. To depend on intra-oral radiographs alone, especially in cases of neuralgia, facial fistula, impacted third molars, and abscess of the lower bicuspids.

39. To fail to use a reading-glass when studying negatives and so avail oneself of the great assistance rendered by the practice.

40. To fail to use the electric test for vitality of pulps in connection with radiographic examinations.

41. To make radiographs of every tooth in the mouth in all cases where the teeth are being examined to locate foci of infection.

42. To mistake a partially-formed tooth for an abscessed tooth.

43. To mistake an abscess of a lower molar for a perforation through the floor of the pulp chamber, or to overlook it altogether.

44. To fail to take into account the shadow cast by the oblique ridges, and so overlook abscesses at the apices of the lower molars.

45. To depend on radiographs made from the "high above" angle —*i. e.*, an extremely oblique vertical angle—if you know what I mean— to find evidence of periapical infection and disclose bone destruction due to pyorrhea.

46. To depend on radiographs made from a horizontally diagonal angle to disclose evidence of pyorrhea.

47. To mistake an abscess for the mental foramen, or anterior palatin foramen, or other normal radiolucent or radioparent area.

48. To mistake a spot (photographic fault) on the negative for an abscess.

49. To mistake a foreign body for a spot (photographic fault) on the negative.

50. To fail to see evidence of infection about lower third molars because evidence of it cannot be seen in radiographs.

51. To mistake the normal appearance of the disto-buccal root of upper molars for an abscess.

52. To mistake the normal radiolucent area, often seen at the apex of the mesio-buccal root, of upper first (and occasionally second) molars, for an abscess.

53. To mistake a nostril spot (not a nasal fossa spot) for an abscess at the apex of an upper lateral (sometimes central) incisor.

54. To mistake the infraorbital foramen for an abscess area.

55. To mistake the pericemental membrane for evidence of pyorrhea.

56. To mistake lapping of the crowns of teeth for fillings.

57. To mistake the facing on a bridge for a piece of tooth.

58. "In extra oral radiographs, to mistake normal radiolucency, in the bicuspid and cuspid region of the mandible, for necrosis." (Quoted from Dr. Nobrou Terunchi.)

59. To mistake the antrum, as it appears in intra-oral negatives, for the thumb nail.

(Let me pause here and concede that mistakes 55, 56, 57, 58 and 59 are absurd, to be sure, but they are actually made!)

60. In an extra-oral negative, to mistake an upper third molar, on the opposite side, *i. e.*, the tube side, for an odontoma.

61. To mistake a Gilmore attachment bar for a post passing through the side of the root of a tooth.

62. To mistake the malar bone for an unerupted third molar, or for an unerupted malposed cuspid.

63. To assume that no contact point exists because it cannot be seen in a radiograph, or, conversely, to assume that a contact point does exist because one seems to exist in a radiograph.

64. To assume that the mesial root of a lower molar, or an upper bicuspid, has only one canal from the appearance of one radiograph.

65. To assume that because a tooth is missing from the jaw its mate on the other side of the mouth is missing also.

66. To mistake the meaning of the lapping of the crown of a horizontally or semi-horizontally impacted lower third molar with the second molar.

67. To mistake a piece of amalgam in the mouth for a foreign body in the bone.

68. To mistake a wire passing into the disto-buccal canal of an upper molar for a wire passing through the side of the tooth.

69. To attribute cases of neuralgia to pulp stones, hypercementosis and bone whorls whenever these lesions are found.

70. To give a diagnosis of the condition of a great number of teeth made on one intra-oral film.

71. To fail to chart all teeth.

72. In cases of metastatic infection, when eliminating certain parts of the mouth from the necessity of immediate examination, to do so

without careful use of the electric test for pulp vitality, and instrumental, ocular and digital examination.

73. To look at one thing in a negative to the exclusion of the balance of the negative.

74. To fail to look for dental caries.

75. To fail to make study sketches.

76. To mistake the interproximal space for a carious cavity.

77. To mistake a canal filling which follows the canal in the mesial root of a lower molar for a canal filling penetrating the side of the root.

78. To mistake a canal filling following the lingual canal in an upper molar for the perforation through the side of one of the buccal roots.

79. To mistake the lingual cusp of an upper bicuspid for a supernumerary tooth.

80. To mistake the incisal fossa for pathogenic osteoporosity.

81. To mistake an appearance of root roughness, due to diagonal angle or other technical factor, for roughness caused by a pathologic condition.

82. To confuse the right and left sides.

WORK gets a better
flavor if we regard
it as a sort of sport
the zest in which is the
effort to excel.

THE NATION'S GREATEST OBLIGATION

For most of us the war is over. We have turned back to the ways of peace, and with more or less difficulty have succeeded in putting Germany and Imperialism and armaments and battles out of our minds. But there are some for whom the war is not over, and they are increasing in number day by day. These are the disabled soldiers, whose disabilities, after three years of peace, are just beginning to appear.

The highest obligation that the nation and the American Red Cross face today is the problem of the disabled service man. Justification of the warning of the Surgeon-General's office of the Army that the nation would not begin to know the number of the disabled for a year, and that the number would probably not reach its peak before 1925, if it did then, is being shown day by day.

Of the men discharged from the Army and Navy and yet entitled to governmental medical treatment and aid, there are at the present time 26,300 in government and private hospitals throughout the country—a number equal to the entire population of a city the size of Lynchburg, Va. This number has increased eight-fold since 1919, and will undoubtedly continue to increase rapidly for several years to come.

Last year the American Red Cross spent approximately $10,000,000 in serving disabled ex-service men and their families. This one branch of Red Cross work cost nearly $4,000,000 more than aggregate receipts from the year's membership dues. Therefore, membership attained through the Fifth Red Cross Roll Call, November 11–24, Armistice Day to Thanksgiving, this year, right now should be greatly increased to insure continuance and expansion of service for the disabled man and his family.

In the hurry and bustle of adjustment to peace time work the public seems largely to have forgotten the soldiers, sailors and marines who were disabled "in line of duty." This has been so apparent that President Harding in his inaugural address called attention to the necessity for increased care of these boys, and in his first Message to Congress recommended coordination of the relief agencies of the government into a "Welfare Service" for those "defenders of the Republic who need the supporting arm of the Government."

In the general hospitals of the Army and Navy, 11,690 men are still receiving care. Most of them are overseas men. The rest are men who, in active service since the ending of the war, because of accidents or sickness require hospital attention. Medical and nursing service are of course provided by the War and Navy Departments, under the supervision of their Surgeons General; but in all of these hospitals the American Red Cross is providing service, convalescent comforts, recreation, in fact doing whatever can be done to help speed the weary days of hospital life. Red Cross chapters throughout the country and members of the American Junior Red Cross send in magazines, fruit, jellies, and other delicacies on holidays and Sundays.

At Walter Reed Hospital alone, which is the largest of the Army general hospitals, and is located on the outskirts of the National Capital are 1,000 men, a large number of whom are still being treated for wounds received in France. Other thousands of men entitled to hospital care are scattered over the country and it is to these men that the Red Cross goes, extending the same friendly, helpful service that it gave during the war. The government provides the opportunity and method for assisting these men but it can only work in the mass and not with the individual. Assistance to the individual is particularly and peculiarly the work of the American Red Cross.

Through its chapter organization the Red Cross comes into contact with virtually every community in this country. It reaches the individual, finds out his conditions, his problems, all his difficulties, and opens the way by which he can obtain government aid and compensation. Any honorably discharged man who is suffering from an injury or disease traceable to his service, is entitled to and may claim treatment from the government and compensation for the time that he must be under treatment.

The fact that an average of 1,000 men per month are now reporting for hospital care is easily explained. In the excitement of their homecoming and of their discharge, the men felt fairly well and buoyed up by the joy of their return went to their homes confident that a little period of rest would be all that was necessary to fit them for the resumption of normal lives.

Now, however, the hidden disabilities incurred by their service are beginning to appear. Old wounds re-open under the strain of physical exertion. Bits of shrapnel work their way into vital parts of the body. Stiffening joints and muscles fail to respond to the tax of labor. Head injuries slowly develop into nervous breakdown and threaten permanent mental disability. The effects of exposure, hardship and poison gas become evident and the men begin to break down. Tuberculosis is developing constantly.

These men are found by the American Red Cross in their homes. The Red Cross worker tells the man how and where to file his application and sees that his papers are in proper order. For the Government, it assembles the applicant's history and present condition for presentation to the Bureau of War Risk Insurance.

Then if there are any difficulties in the way of the man going to the hospital the Red Cross stands ready to remove them. It provides him with the necessary clothing, it looks after his immediate obligations—if there are any, and guarantees that they will be taken care of. It provides care for his family for such time as may be necessary until his Government compensation comes through.

Of the 3,402 active chapters of the American Red Cross 2,397 are still maintaining organized service for the disabled men. The Government through the Bureau of War Risk Insurance, has asked the Red Cross to assist with the American Legion also cooperating, in a complete canvass of the country with a view of locating every disabled man that he may learn of his rights and privileges and be put into the way of receiving them.

In sixty-two United States Public Health Service hospitals the Red Cross maintains 448 workers to provide friendly service to veterans. When a patient arrives at a hospital the Red Cross worker on duty there greets him. She keeps his family informed of his progress and if he is worried about his folks she obtains information direct from his town; when his compensation check arrives, forwards it to his family. During the last year the Red Cross, at the request of the Government, located the owners of 63,655 checks that had been drawn to the order of disabled soldiers whose addresses had been changed or lost.

By such continual service the American Red Cross demonstrates that it has lost none of its sympathy and efficiency in the transition from a war to a peace time agency, but that at all times and in all circumstances it "stands by." Hundreds of men are found in these hospitals who never have a visitor, who seldom, if ever, receive a letter. To them especially, the American Red Cross is counselor, helper and friend.

Among the great army of the disabled none are so pathetic, with perhaps the possible exception of those with a permanently unbalanced mind, as the blind. Those men who gave their eyes for humanity are the special care of the American Red Cross. At Evergreen, near Baltimore, Md., the Red Cross carried on the work of care and training for blinded heroes. By vocational training many of them have already been fitted for useful and remunerative labor. All have been taught to read Braille, and Red Cross chapters have developed experts in making Braille books for these boys.

Not only is the Government, through the War Risk Insurance Bureau, caring for the disabled soldier who needs hospital care, but under The Federal Board for Vocational Training, approximately 80,000 men who, by their disabilities were thrown out of their former occupations, are being re-trained for self-support, and an average addition of 5,000 a month are entering upon this line of education. They are scattered among some 2,000 colleges and other institutions throughout the United States. More than 3,000 have completed their courses and have gone back to their homes ready to take up life as self-supporting individuals with usefulness and happiness in store for them.

Training is not merely offered to the men by the Government but they are sought out by the Red Cross and persuaded of its advantages. To a large number the obstacles in the way of accepting training seem unsurmountable. They do not understand that they are entitled to compensation during the time they are receiving instruction, nor are they free from the haunting worry as to what is to become of their families while they are away. Then there are the problems of the families themselves. Foreseeing all these difficulties the Federal Board turned at once to the American Red Cross for co-operation in providing this personal service and along no line of post-war activities has the organization found more necessary and satisfactory work. During the six months up to February, 1921, nearly 90,000 cases of this kind have been handled by the American Red Cross.

From November, 1919, until July 1st, 1921, the American Red Cross had a loan fund for men in training to which an appropriation of $375,000 was made. Something more than three-fourths of this was turned over to the Federal Board to be loaned to men who had actually entered training. The balance was expended by Division offices of the Red Cross in loans to men while their cases were being investigated or to aid in care of their families. The total number of loans made last year was 32,495. More than 85 per cent. of these loans have been repaid.

On July first through an appropriation by Congress there is now available a similar revolving fund of $500,000 from which men taking vocational training may borrow to meet temporary financial needs. Disabled ex-service men whose applications for training are still in "investigation status" are not eligible to this assistance, however, and will continue to receive such assistance from the American Red Cross.

The American Red Cross has made an appropriation of $175,000 to provide recreation facilities for the men in the training centers during the coming year. This step was taken when the Board called to the attention of the Red Cross the great need of equipment for this purpose. Expenditures from this fund will be confined to the equipment of recreational rooms or buildings at training centers. Personnel to direct the recreational activities will be furnished by the Federal Board which will also provide quarters for the activities. The recreation thus made possible will include social and musical evenings, minstrel shows, "movies," and club features of various kinds. The Federal Board attaches much importance to recreation for trainees, experience having shown that men without proper recreation and outside stimulation often discontinue training or fail of progress in their work.

For the other soldiers the boys who have gone never to return, the American Red Cross performed a last service by sending photographs of their individual graves to the next of kin. This branch of post-war service was greatly appreciated by the relatives of the fallen heroes. Sixty-five thousand, five hundred and thirteen photographs were mailed out and only two thousand have been returned marked "unclaimed."

The Red Cross, in this one branch of its work alone, spent $10,000,000 last year. Yet from its dollar membership dues it took in only $6,000,000. It doesn't take any great mathematical skill to discover what will happen if the American people do not support the Red Cross more enthusiastically during the coming membership Roll Call, which will be held November 11—24. It is the duty of those who realize the situation, the need for continued and unremitting service, not only to the disabled soldiers, but to the sick and suffering wherever they may be found to join the organization and to see that their friends join. Only thus can the Red Cross work be continued.

EDITORIAL

SCHOOL DENTAL CLINICS AND TAX LEVY FOR ESTABLISHMENT AND MAINTENANCE

Oral hygiene is now taught more or less in many of our public schools. Fewer have medical and dental inspection, and comparatively few have dental clinics. Schools that do have dental clinics, in connection with dental inspection, are located principally in various larger cities. In some of these Boards of Health have furnished means for maintaining the clinics; in others the funds have been supplied through private contributions and there are but few instances, so far as we know, where funds are supplied by the State. We want to call your attention to one of these:

Over in our sister-state, West Virginia, the state legislature in 1919 passed the following law relative to medical and dental inspection in public schools of that state:

> Sect. 64. "Boards of Education of independent school districts shall, and boards of education of districts may, employ proper medical and dental inspection for all schools of their district."

In April 1921, the legislature passed another law legalizing dental clinics and mouth hygiene instruction in public schools as follows:

> *An Act* relating to mouth hygiene and the treatment of pupils in the public schools, the same to be section sixty-four-*a* of chapter two of the acts of nineteen hundred and nineteen, regular session.
>
> *Be it enacted by the Legislature of West Virginia:*
>
> That chapter forty-five of the code, as amended by section sixty-four of chapter two of the acts of one thousand nine hundred and nineteen, be amended and re-enacted by adding thereto section sixty-four-*a*.
>
> Section 64-*a*. The board of education in any school district may, at its discretion, establish and maintain dental clinics or courses for teaching mouth hygiene; and may provide for and furnish treatment, if requested by the parent or guardian or deemed necessary by the board of education, of such children who have defective teeth or mouth conditions, and who shall be found by such board of education, or persons deputized for that purpose, to be unable otherwise to procure such treatment. Any expense incurred in connection herewith shall be paid out of the maintenance building fund of said district. Passed April 8th and to go into effect ninety days after date of passage.

Later in the 1921 session the legislature passed a bill legalizing the dental hygienist. Said dental hygienists are permitted to practice in the office of any registered or licensed dentist, under his direct supervision, or in any industrial clinic, school clinic or state institutional clinic where they may practice under the general supervision of a registered or licenesed dentist.

This insures for that state dental inspection in the public schools, establishing and maintaining school dental clinics and the employment of dental hygienists to assist in the inspection and prophylactic work. Any expense incurred in connection with the dental clinic is to be paid out of the maintenance building fund of the various districts in which such schools are located.

Members of the dental profession in states that now have no such laws would do well to get busy and obtain some legislation of this sort. And when all the states enact similar laws we can hardly estimate the benefits that it will bring to our rising generations.

In this issue there appears a paper on this subject, read by Dr. G. T. Epling before the West Virginia State Dental Society, which will give our readers more information about school dental clnics.

DIED—At St. Vincent's Hospital, Toledo, Ohio, October 4, 1921, A. C. Musgrave, M. D., D. D. S., aged 47.

Dr. Musgrave was a member of the Toledo Dental Society, of the Ohio State Dental Society and of the National Dental Association. He served in the Dental corps of the A. E. F., during the great war. The body was taken to Ohio City, his old home, where interment took place, accompanied by military and Masonic honors.

At the regular meeting of the Toledo Dental Society, October 11, a committee was appointed to draft resolutions of respect and regret at his loss, which will appear among the proceedings of that body in a later number.

EVERY man owes some of his time to the upbuilding of the Profession to which he belongs.

—*Theodore Roosevelt.*

OHIO STATE SOCIETY

ANNOUNCEMENT

FIFTY-SIXTH ANNUAL MEETING

MEMORIAL HALL, COLUMBUS,

December 6, 7, and 8, 1921

TUESDAY—10:30 A. M.

Brief business session in Post Hall, followed by meeting of Directors.

TUESDAY—2:00 P. M.

Address by the President, Dr. H. M. Semans.

Illustrated paper by Dr. Chas. F. Bowen (M. D.), "Foreign Bodies of Dental Origin in the Lungs and Oesophagus" with diagrams and methods of removal.

Paper by Dr. L. L. Sheffield, "Essentials in the Construction of Artificial Dentures."

TUESDAY—8:00 P. M.

Paper by Dr. Otto U. King, General Secretary of the National Dental Association, "Adding Ten Years to the Life of Man."

Paper by Dr. H. C. Brown, "The Dental Hygienist as a Factor in Health Conservation."

WEDNESDAY FORENOON

Miscellaneous clinics by members and by exhibitors. These will be well diversified, covering all phases of practice and newer methods.

WEDNESDAY—2:00 P. M.

A series of brief papers on timely topics.

"Medical and Surgical Treatment of Devitalized Teeth,"by DR. G. P. BANNISTER.

"Prescription Writing," by DR. W. C. GRAHAM.

"Removing the First Inferior Molar," by DR. A. J. LEWIS.

"The X-ray in Your Practice and Mine," by DR. J. W. SIEGFRIED.

"Bridge Stunts," by DR. T. T. BRAND.

"A Discussion of some Fundamentals of Full Denture Construction," by DR. R. C. HARKRADER.

"The Practice of Educational Dentistry," by DR. PAULINE M. HEIBERT.

"Diagnosis of Diseases of the Pulp," by DR. W. H. O. MCGEHEE.

WEDNESDAY—8:00 P. M.

Paper by Dr. Edgar D. Coolidge, Chicago, on "Some Interesting Results of Root Canal Treatment and Filling," illustrated with the steriopticon.

THURSDAY FORENOON

A number of group and unit clinics will occupy the forenoon of Thursday, the subjects of which are not available at this time but we are assured they will be both instructive and diversified.

A special and new feature for Thursday morning will be "A Consultation Orthodontia Clinic." A number of specialists in orthodontia will be present to give advice and assistance to those having puzzling cases. Bring your casts and your troubles and keep the orthodontists busy.

We hope and expect to have the programs in the hands of our members at a reasonably early date, printing conditions permitting.

Members of other State Societies are cordially invited to attend our meetings. Present your cards of membership to the secretary and obtain a guest badge.

It is most advisable that all persons contemplating attending should make hotel reservations. The secretary will assist you if you wish.

VERY IMPORTANT

The National Dental Association is making a campaign for an increase in membership of 15% for 1922, and looks to Ohio to furnish her quota. This means much to us. We never fell down yet and don't intend to do so now. Let each component line up all of its old members and add 15% to the total and we will do it. WILL YOU DO YOUR PART? SURE YOU WILL! THEN GO TO IT.

The TOLEDO DENTAL SOCIETY

OFFICERS

W. H. Hisey, 1201 2d Natl. Bank Bldg.
President
C. H. Cox, 714 Nicholas Bldg.
Vice-President

G. E. Markley, 320 Superior
Secretary
F. B. Conkle, Wedgewood Bldg.
Treasurer

COMMITTEES FOR 1921-1922

PROGRAM

W. W. Penske, 227 Superior, *Chairman*
L. E. Phelps
P. J. Kuebler
J. W. Hartshorn

ORAL HYGIENE

Eva Shapiro, *Chairman*
D. A. Elwell
J. J. Welker

BOARD OF CENSORS

J. F. Hannon, *Chairman*
L. T. Canfield
F. J. Beroset

CLINIC

W. H. Tenney, *Chairman*
R. K. Wood
R. H. Vollmayer

DENTAL LEGISLATION

W. S. Graves, *Chairman*
W. S. Sargent
A. A. Van Ark

MEMBERSHIP

W. J. Dierks, *Chairman*
J. W. Travis
J. D. Sullivan

OUTING

O. O. Leininger
R. L. Bearss
L. C. Jackson
E. F. Bach

SOCIAL

L. L. Zarbaugh
H. R. Francis
G. W. Dierks

CRITIC

L. L. Barber

It is the purpose of The Dental Summary to devote a Department to the doings of The Toledo Dental Society. Dr. W. W. Penske, Chairman Program Committe, has been appointed Reporter. All news of interest to the members should be reported to him. It is not necessary that the contents of the Department be confined to matters of serious professional or technical nature. Let's have it all, grave and gay. By working together we believe that we can make this section of The Summary of more than local interest.

What we have agreed to consider as the first regular meeting for the season '21-'22 was held at Sylvania Golf Club, Friday afternoon and evening, October 14, with an attendance of 41.

The afternoon was devoted to golf, being qualifying day in the annual championship tournament of the Society. Dr. T. S. Shaw and Dr. J. J. Welker tied for Bronze Medal for best score of the day, 82 for eighteen holes, Dr. Shaw winning on the toss of a coin.

Dr. W. W. Penske won booby prize for high score.

Dr. J. K. Douglas, of Sandusky, won the prize for finding the creek oftenest during the day. The boys say Dr. Douglas "took water" at least eighteen times—one for each hole. Didn't know Doug. was so fond of the stuff!

Welker seems to have some sort of drag with the Committee. He pulled down three prizes.

The pairings for the first flight are:

Welker *vs.* Phelps
Pilgrim *vs.* Hisey
W. S. Sargent *vs.* Francis
Geo. W. Dierks *vs.* W. J. Dierks
Vollmayer *vs.* Bach
Graves *vs.* Shaw

Sipher *vs.* Hartshorn
J. E. Sheffield *vs.* Travis

The winner of the championship medal will be announced next month.

Here is a tip to other societies that may desire to pull off a tournament: The entrance fee was two old gold crowns, which were cast into a fine watch-fob.

The dinner was a dandy, even if Bill Dierks did preempt more than the lion's share of the chicken.

Following the dinner, a business session was held, and many matters discussed. Dr. Eva Shapiro, Oral Hygiene Committee, presented for consideration the matter of an Oral Hygiene Day, to be held shortly after the Christmas holidays, suggesting that Dr. Fones, of Bridgeport, Conn., be brought to Toledo, to head the talent for the day. It was suggested that the Board of Education and other welfare bodies be interested and asked to cooperate. Drs. Barber and Elwell took part in the discussion. Definite action was postponed, pending further information to be obtained by the Committee.

The matter of reinstating members who drop out was discussed. The concensus of opinion seemed to be that such members should be required to pay back dues, but just what amount was not decided, the matter being left open for the present.

Part of the introduction to the booklet issued by the Dental Welfare Foundation on the subject of the education of the public along dental lines, was read by Secretary Markley, and some little discussion followed. It was the general opinion that the Society should take no action, the matter to be left to the judgment of the individual. (It is the opinion of THE SUMMARY that this matter is one that deserves very serious consideration. For the first time in dental history a plan has been devised that can be made to work for the good of humanity, and, at the same time, for the particular advantage of every practitioner of dentistry, at a very small cost to the individual dentist. For forty years such a plan has been sought; and, now that it has been found, it should receive enthusiastic support.)

Resolutions on the death of Dr. E. M. Cook were presented by Dr. Travis, of the Committee appointed by the Chair for that purpose, were accepted and ordered spread upon the minutes.

A committee was appointed to draft resolutions upon the death of Dr. A. C. Musgrave.

Following the business session a paper was read by Mr. G. E. Harter on "Everyday Diet for Efficiency and Comfort," ably discussed by Drs. Welker, Barber and Sweetnam. The paper will be printed in later editions of THE SUMMARY

It was the unanimous verdict of those in attendance that the men who stayed away missed SOME meeting.

Dr. Penske announced the next meeting to be held at Commerce Club, on the evening of Friday, November 11. The entire evening will be occupied by a clinical demonstration of new goods perfected and offered by The Ransom & Randolph Co., given by Dr. Guy Katner, of The Michigan State Society, and assistants, to be followed by a scientific paper by Mr. T. E. Moore, head of the Chemical Laboratory and Research Departments, under the title "The Scientific Consideration of Some New Dental Materials."

The meeting will be preceded by the usual six-o'clock dinner.

Among the questions to be discussed at future meetings is the following: "*Resolved:* That in these days of high-cost and low-quality of gas, it is just as well to allow your machine to run all night." Affirmative—W. J. D.; negative—everybody else.

Dr. Lyman Zarbaugh spent last month in California, where he assisted in the fight against discontinuing the examination of school children. It's a safe bet that Lyman said a few things that his hearers will remember.

Beginning September 12, Dr. L. L. Sheffield conducted a two-weeks course in denture prosthesis down at Atlanta, incidentally addressing the Atlanta Society on kindred subjects. He has a good set of slides that we'll be wanting to have shown to us one of these days.

The study clubs have started work for the winter.

Welker, Hartshorn and Phelps are spending time over in Cleveland these days, doing preliminary work on the Northern Ohio program for next June. Bet they pull a golf tournament.

Don't forget that the Ohio State begins on Tuesday, December 6 this year. Let's send down a rousing delegation.

Call Leininger by 'phone, and get in on the bowling league proposition.

McUmber was hunting squirrels in Northern Michigan when this was written.

The dinner dance at the Yacht Club in September was attended by some forty couples, and was a very enjoyable affair.

"Tinkle, tinkle, tinkle, Dr. Conkle; have you paid your dues?"

NEWS and OPINIONS

CONDUCTED BY G. E. HARTER

The Kind of Letter I Like

BACK UP YOUR STATE BOARD AND ROOT OUT OFFENDERS

Editor N. & O.:—In your News and Opinions for October, I notice reference to fines of from five to fifty dollars for illegal practitioners of dentistry. I have had three prosecutions in Cincinnati and convicted three. One, an ex-service man, got fifty and costs, forty-five was suspended. A woman received fifty and the man who employed her, one hundred and fifty.

The State will prosecute but there is no provision made for getting evidence. I have a movement started in the Cincinnati Dental Society that the delegates be instructed to vote one thousand dollars out of the State Treasury to procure evidence, that the committee on laws and legislature of the State Society see that the minimum fine for illegal practicing be not less than $500.00 for the first offense, and that they get a fund to take care of evidence.

This can be put over if a few get interested. This will be reported back to the Dental Society and I am sure it will pass. I believe that a good editorial by yourself along these lines would be more for the good of the profession than several volumes on conditions affecting the filling of root canals. Another thing which should be brought out is that if all the dentists of the State Society would back up the Ohio State Dental Board (which is not a political machine, which many of them think) and not write so many anonymous letters, we could close up over half the advertisers in the State who are practicing illegally.

They are willing to pat you on the back every time you get your own evidence and have one arrested, but none of them put their shoulder to the wheel. There are at least a dozen men here running and working in offices that could be convicted, if we had money to procure evidence. The State Society has plenty of money and it won't hurt them to donate $1,000.00 this year. Next year there should be a law put through requiring every dentist in the State to register every year paying at least one dollar. This would take care of evidence, prosecutions, etc., and you could check up on every man practicing in the State. If you are not in sympathy with this movement, no harm has been done but if you are I am sure some good will come from it.

Sincerely,
C. H. BURMESITER.
Cincinnati, Ohio, Oct. 14, 1921.

The illegal practitioner of so-called dentistry should be put out of business and kept out. If fines and short terms of imprisonment will not do it, heavier fines and longer terms may be effective. But *whatever is necessary should be done, and done promptly and very thoroughly.* If ordinary means fail turn 'em over to the K. K. K.! That amiable and efficient body of American citizens has a little way with it that gets the bacon. Whatever may be said as to the legality or illegality of that organization, it certainly knows what it wants and knows how to get it. You may have noticed that every criticism with which the lay press has been more or less saturated of late winds up with some such statement as this: "Undesirable citizens cease to be undesirable or evaporate." Uh-huh! And did you notice how the Congressional investigation blew up?

Of course, I am in sympathy with every word written by Dr. Burmeister. In my mind there isn't the remotest doubt that the State Society should back up its Board, by appropriating money and in every other way; neither is there the slightest doubt that each individual member should do his part locally by helping to secure evidence and by presenting it at the proper time and in the proper way. No use being mealey-mouthed about this thing. The illegal practitioner usually is the inefficient bungler, who should not be permitted to prey upon the public. I cannot imagine an able dentist practicing illegally. Why should he? The Board is open to him and it is much easier to secure license and registration than it is to dodge arrest and prosecution. Illegality and inefficiency are synonymous in my mind. Even if a man hasn't the necessary college qualifications, there are many avenues of honorable employment in connection with dentistry open to him. I know of several able demonstrators and detail men who were once successful practitioners, but without the necessary diploma. They gave up practice and entered the commercial field, where they have won distinction. No, there's no excuse for the illegal dentist. Put him out.

Fit and Unfit Dentists

Some years ago the field of medicine was overrun with a rank growth of charlatans, with only here and there a few really able and conscientious practitioners. Through the medium of the better type physician, boards of health, and other agencies, the quacks were, fortunately, weeded out of the profession, and so effectively that now one need have little hesitancy in placing the fullest confidence in the ability and probity of the average doctor.

But it required hard and patient effort to clear out these bunglers and frauds in medicine and it is quite likely that it will require as strenuous and patient effort to separate the fit from the unfit in the field of dentistry. Yet it is a work that must be undertaken if the good name of the profession is to be prevented from falling into disrepute and the public protected. That it is as important to identify and turn out the misfits in the dental profession as it was to oust the quacks from the medical, there can be no doubt. And the sooner they are weeded out the better it will be for the welfare of the general public.

The boards of health throughout the country should be given increased power to investigate the character and ability of all those practicing dentistry in their respective localities, and whenever a man's ability and honesty are questioned, to take what steps are necessary to safeguard the public This would effectively force the inefficients and frauds out and leave the field to the competent and conscientious dentists.

The difficulty, in the first place, exists in the ease with which one may take up the study of dentistry. At present it is necessary to have a minimum of only two years' high schooling to enter dental college. This should be raised to four years. Then the standards in all of our dental colleges should be perceptibly raised so as to allow only those best fitted to pursue the study. Nowadays almost any one can get a diploma to practice dentistry.

The state examinations, coming after graduation, should be made more difficult; should bring out with greater clearness whether one has the indispensable practical skill no less than the theoretical knowledge of the business. Finally, in the case of its being shown at any time that one is turning out wholly inferior work or observes any but the highest ethics in his dealings with his patients, it should be a simple procedure for the proper authorities to revoke his license to practice.

The public is entitled to some protection against the incompetent and unscrupulous dentists, whose numbers are larger than suppose by the uninformed, and increasing each year.

J. P. P.—in N. Y. *Evening Post.*

Cancer of the Tongue a Preventable Disease

Dr. Joseph C. Bloodgood, M. D., Baltimore, contributes a letter to the *Jour. Amer., Med. Asso.*, as follows:

In a recent reinvestigation of 260 cases of cancer of the tongue, the evidence seems convincing that this cancer is due to long and continuous chronic irritation by tobacco, by repeated burns from smoking, by continuous irritation, or direct wounds of dirty, rough teeth, or improperly-fitted plates. In carefully-taken histories there is hardly a record of a cancer of the tongue in an individual who has not been warned by definite local lesions which were not cancer and which have been present months, and usually years, before the development of cancer.

There is every evidence to conclude that if this information is widely and correctly disseminated, and the public, the medical and dental profession realize that cancer of the tongue is a preventable disease, death from cancer should largely disappear.

My experience with the operative treatment of cancer of the tongue in its early stage shows only 62 per cent. of five-year cures and only 12 per cent. of five-year cures after the most extensive radical removal of advanced cancer During a period of thirty-two years (1889 to 1921) there have been 14 per cent. (thirty-six cases) of early cancer of the tongue, with 62 per cent. five-year cures; 28 per cent (seventy-five cases) of advanced or late cancer of the tongue, with 12 per cent. five-year cures; and 18 per cent. of inoperable cancers of the tongue with no cures.

This study, which has been carried on continuously since 1910, leads me to the conclusion that more lives can be saved by the education of the public and the medical and dental professions on the *causes and prevention of cancer* of the tongue, than by any improvement in surgical technic, or any combination of treatment with the knife, cautery, radium or roentgen rays, for cancer of the tongue

In my own sphere of educational influence, the propaganda of teaching has increased the number of benign precancerous lesions from 3 per cent. in the first decade (up to 1900) to 48 per cent. in the third decade (1910-1920); and so far in the beginning of the fourth decade (1920-1921) the percentage of benign lesions is 55. There is every reason to believe that these 105 men who have come under observation, entirely as the result of educational propaganda, have been largely protected from cancer. The cause of their local lesion has been removed, and they have been informed on the details of oral hygiene for their future protection.

During the same period the percentage of early cancer has increased from 3 to 23; advanced cancer has decreased from 48 to 11 per cent., and hopeless cancer from 44 to 11 per cent.

Cancer of the tongue is a disease of men who smoke in excess and carelessly, or who chew tobacco constantly, and in addition, neglect the teeth.

The most common warning is leukoplakia, single, multiple patches, or diffuse white patches in the mouth. The individual is always aware of them, usually for years before cancer develops. The treatment is to remove the cause. The use of tobacco in all forms should cease at once, and the teeth should be put and kept in perfect order. It may require three or four years for the leukoplakia to disappear.

The second most common warning is a local area of irritation adjoining ragged, dirty. teeth Tobacco should be discontinued, and the teeth put and kept in perfect order.

Syphilis as an etiologic factor has been exaggerated. If there is a history of syphilis and a positive Wassermann reaction, specific treatment should be promptly administered; but subsequent development of cancer will not be prevented by this treatment alone. The causes—tobacco and dirty, rough teeth—must be eliminated at once.

Local treatment of leukoplakia or of the area of irritation by radium, roentgen or any irritating caustic is contraindicated. The cause, must be removed first; then, if the local lesion except leukoplakia, does not rapidly disappear, it should be excised with a good margin of healthy tissue with the cautery. Do not excise a piece for diagnosis. Remove the area with such a good margin of healthy tissue that, if the microscope reveals early carcinoma, there will be no indication for further local operation.

The prevention of death from cancer of the tongue depends on these simple instructions in oral hygiene.

Note—Dr. Bloodgood is writing an arteicl on this subject for THE DENTAL SUMMARY and it will be published in this journal in due time —Editor.

A letter came to me the other day concerning our Service Department about which a little was said in October issue, that suggests a development of that department that will make it very useful to every reader of THE SUMMARY. It is that it be amplified, spread out and enriched until it be made a veritable Clearing House for dental problems, professional, technical, or otherwise. The idea is a good one, and is hereby most heartily accepted. Among the questions asked by the writer of that letter was where he could buy certain articles mentioned in papers printed in certain dental magazines—unusual articles, not generally carried in supply-house stocks. As such questions should not be answered through the magazine, a stamp was enclosed for reply, which went forward promptly through our Service Department.

Just a word about the equipment of that Department. It has access to the services of the entire editorial corps of THE DENTAL SUMMARY, to many eminent and prominent men who are specializing in some branch, to completely-organized chemical, mechanical and engineering corps, equipped with all the appliances necessary for physical and chemical analyses, and to a number of successful business men able to cope with almost any sort of financial problem—except the rehabilitation of Germany, possibly!

Can this Department be of use to you? You are very welcome.

Quite a little flood of mail has come to me in regard to the local anesthetic, pyorrhea treatment and the gasoline-burning device mentioned last month. Every letter has been or will be answered personally just as fast as I can get around to it. Two papers have been prepared, one on "Local Anesthesia in Denttistry," the other on the "Safe, Sane, Simple and Sensible Treatment of Pyorrhea," for publication in foreign magazines. As these are not likely to appear in any Anerican magazine, I am willing to send copies of them to any reader of THE SUMMARY who will agree to read them carefully, accept them as they are meant, and return them to me when they have so read them.

Dentists are forbidden to prescribe drugs and medicines; but if they are forbidden to prescribe the correct diet for health, comfort and efficiency, I have yet to hear of it. I believe that all human diseases have their origin in improper diet, not excepting dental caries. The ordinary dietary is almost hopelessly acid-forming, poor in calcium, phosphorus and iron. The remedy is very simple. Instruct your patients; tell them how to reform their dietary until they reach the point where all the necessary minerals are supplied in satisfactory quantities, and where the alkali-forming foods at least balance the acid-formers. A system that is hyper-alkalin is almost proof against ordinary ills; one well supplied with mineral salts will be immune to caries. Possibly, I can help you in this. If you care to ask for it I will send you a condensed table giving acid-and alkali-forming foods, and also those from which the three important minerals, calcium, phosphorus and iron, are obtained.

Don't let anybody fool you into the belief that there never is to be another great war. There was a time when preventive measures were possible, but the world, particularly the United States, refused to take advantage of it; and now we are drifting toward another cataclysm as sure as the sun shines. We are in for a period of militarism, in which America must play the leading role. Keep this fact in mind, and be ready to do your part. "In time of peace prepare for war."

Grade your patients. The man who is receiving and distributing $100 a week is worth ten times as much financially to his community as the man who is handling only $10 a week. Therefore, services rendered to him are worth more to the community, and should be paid for at a higher rate. Get it? If you don't, write me about it.

Authorities now say that there is not on record a single case of recovery from mental disease, insanity, etc., that can be traced to the removal of diseased teeth. May be not; but there can be no doubt of the greatly increased comfort and efficiency following such dentistry.

A Practical Course in Dental Economics

under the direction of

GEORGE WOOD CLAPP, D.D.S.

November, 14-19, 1921, inclusive.

THIS course is intended to instruct dentists in the application to their practices of the economic principles upon which Dr. Clapp has written and lectured for the past twelve years.

Instruction will be by means of lectures, quizzes and practical class exercises. It is possible to present here only the merest outline. Detailed information may be had from the booklet mentioned later. It will be divided into three general groups, as follows:

Part I. Monday. Preparatory work.

Getting bigger and better ideas in place of some old ones; lectures and quizzes upon conceptions of ethics and economics; planning a successful outcome of the whole life; dentistry as a profession and a business; and the place and function of these phases; lengthening the great earning period; office hours and their relation to success. Wives of members are invited on this day.

Part II. Tuesday morning to Friday noon.

How to find out what it costs the dentist to render different qualities of dental service and how to use the information in setting fees that are fair to the community and the dentist. Practical exercises in making professional and business records; lectures and quizzes. Members may have their secretaries present through Part II, but this will not relieve the member from the actual accounting exercises, which are essential to profit from the course.

Part III. Friday noon to Saturday noon

> How to save enough money to live on when too old to work. The competency for old age; amount; manner of accumulating; life insurance as protection and investment; investments suitable for professional men; the moral courage to save money. Wives of members are invited to attend this part.

If health permits, Dr. J. Leon Williams will open the course on Monday, November 14th, 1921, and close it on November 19th with two lectures which will be of great interest and value to each member of the class. If he can not, the lecture will be given by another.

FEE PAYABLE ON A MONEY-BACK BASIS

Fee $100.00, payable $50.00 upon registration, balance November 7th.

To any dentist who, on November 18th, will state to the Director that the instruction has not been worth the money he has spent for transportation to and from the class, hotel bill and tuition, and the amount probably lost through absence from his office for the week, the tuition fee of $100.00 will be returned on November 19th.

Class limited in numbers. The class work will require attendance from 9 to 12 daily, and from 2 to 5 each day except Saturday.

Admission to the class may be had only by filling out a special application form which, with a booklet describing the course in detail, will be sent upon request.

The course will be given in the laboratory of

The Research Division

THE DENTISTS' SUPPLY COMPANY

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California attorney-general has ruled in favor of the legality of using state school funds for the establishment and maintenance of dental clinics in schools. The ruling was the result of a fight to do away with the Los Angeles clinic, supported jointly by the school board and the parent-teachers' association. Dr. Lyman L. Zarbaugh, of Toledo, a visitor at Los Angeles at the time of the attack on the clinic, is credited with able service towards its preservation. *The Examiner*, of that city says:

Dr. L. L. Zarbaugh, of Toledo, Ohio, happened to be in the city and read in yesterday's *Examiner* the account of the anonymous effort to have the dental clinic stopped, and he came to *The Examiner* office to express his stern disapproval of any such move.

"I have had considerable to do with such work in Toledo and St. Louis," he explained, "and I know how invaluable it is to the community and that it is a matter of economy for taxpayers. If a child has defective teeth it cannot keep up with its classes and has to be kept on an added year or so at school, all of which costs money.

"In Valparaiso, Ind., they had scarlet fever very badly and after the dental clinic was created in the schools it began to disappear and now is nil.

"When I read the account in *The Examiner* that it is wished by some to do away with the clinic I was astonished to see such a trait of ignorance in a city like this.

"It is the prevalent practice in eastern cities to maintain such clinics, and the result is now unquestioned as a benefit to the community and an economical measure.

"If the public understood just what it meant to close the clinic there would be such a protest that all opposition would be done away with."

Crowthers Heads Dental Society

Dr. H. L. Crowthers of Caldwell, was elected president of the Muskingum Valley Dental Society at the recent annual fall meeting.

Dr. T. E. Axline, Zanesville, was chosen president-elect and other officers named were: J. A. King, of McConnelsville, vice-president: Myron W. King, of McConnelsville, recording secretary; H. J. Boyd, Cambridge, treasurer; H. B. Hune, Caldwell, corresponding secretary; A. W. Boyd, Cambridge, trustee; H. L. Crowthers, Caldwell, alternate committee.

Dr. C. D. Hoy, of Columbus, addressed the meeting on the subject "Mouth Infections and Their Relations to Medicine and Surgery," and he was followed by Dr. W. I. Jones, also of Columbus, who spoke on "Facts and Fads About Anaesthesia."

Sixty well-known dentists, representing six counties of Southeastern Ohio, were in attendance at the meeting.

Work has been started on the new dental buildings for Marquette University, Milwaukee.

Indiana—Northern

The thirty-second annual meeting of the Northern Indiana Dental Society was held at Fort Wayne, October 3 and 4, with less than the usual attendance, owing, possibly, to the delay in mailing announcements.

The local arrangements, as to the place for sessions, accommodations for exhibitors and entertainment, were all that could be desired, the Fort Wayne members having gone the limit to make the affair enjoyable as well as helpful.

Among the speakers were Dr. W. E. Harper of Chicago, Dr. Charles Southwell of Milwaukee, Dr. J. W. Thompson of Fort Wayne and Dr. H. T. Berkey.

A large exhibit of dental supplies and equipment, representing twenty-seven firms was on display.

A. L. Harter, of Kokomo was elected president. Other officers are: Vice-president, F. B. Garner of Muncie; secretary, N. W. Hiatt, of Marion; treasurer, W. E. Neuenschwander, Fort Wayne.

The meetings, under the presidency of Dr. W. S. Walters, of Lafayette, showed a very marked improvement in the conduct of business a great deal of which was disposed of in an orderly and commendable manner.

The subject of the education of the public along oral hygiene lines as proposed by the Dental Welfare Foundation, was presented by Mr. G. E. Harter, and enthusiatically received and cooperation promised. The next meeting will be held at Wabash.

Ohio—Western

Sidney, October 8.—After enjoying luncheon at the Wagner hotel, the meeting of the Western Ohio Dental Association adjourned to the courthouse, where business was transacted and a short program given. Dr. Wilbur Munger read an instructive paper on "Synthetic Porcelain," and Dr. Beebe, of Sidney, spoke on the "Relation between the Physician and the Dentist."

The election of officers resulted as follows: President, Chester W. Sheridan; vice presidents, Shea, Sidney, Little, Greenville and Kemper, Tippecanoe City.

Secretary - treasurer, Frank McCollough, Troy; Director, Wilbur Munger; Alternate, Davis, Troy.

Dentists of Rome, N. Y., are conducting a school clinic this year with the object of proving its benefits to the school board. If successful, a salaried dentist will take charge next year

By the aid of the Red Cross, Dr. Kellogg and others, the Battle Creek, Mich., school clinic has proved to be a great success. What was a venture a year ago, has come to be regarded as a prime necessity. If interested as to ways and means, write Dr. Bertha L. Olsen, who is in charge of the work. She'll be glad to tell you all about it.

Dental Hygienists Wanted by U. S. A.

The United States Civil Service Commission announces an open competitive examination for dental hygienist. Vacancies in the Public Health Service throughout the United States at $720 a year, plus quarters, subsistence, and laundry, or $1,560 without quarters, subsistence, and laundry, and vacancies in positions requiring similar qualifications, at this or higher or lower salaries, will be filled from this examination, unless it is found in the interest of the service to fill any vacancy by reinstatement, transfer, or promotion.

Appointees whose services are satisfactory may be allowed the increase granted by Congress of $20 a month.

All citizens of the United States who meet the requirements, both men and women, may enter this examination; appointing officers, however, have the legal right to specify the sex desired in requesting certification of eligibles.

On account of the needs of the service, papers will be rated as received and certification made as the needs of the service require. In the absence of further notice, applications for these examinations will be received by the Commission at Washington, D. C., until the hour of closing business on December 1, 1921. If sufficient eligibles are obtained, the receipt of applications may be closed before that date, of which due notice will be given.

Applicants must have successfully completed at least three years of high school.

Eligibles resulting from the examination will be arranged in two grades. The position of oral hygienist will be filled from (*a*) when eligibles from that grade are available, or from (*b*) when eligibles from (*a*) are not available.

(*a*) Those who are graduates from an approved school of dental hygiene or from a recognized dental college.

(*b*) Those who are not graduates but have had private training along lines of oral prophylaxis in an ethical dental office for a period equal to that required for graduation from an approved school of dental hygiene, or who have been accepted for registration by a State recognizing dental or oral hygienists.

The necessary certificate or other evidence to establish claims made must be filed with the application.

Applicants must have reached their eighteenth but not their thirty-fifth birthday on the date of the examination. These age limits do not apply to persons entitled to preference because of military or naval service.

Classified employes who have reached the retirement age and have served fifteen years are entitled to retirement with an annuity. A deduction of 2½% per cent. is made from the monthly salary to provide for this annuity, which will be returned to persons leaving the service before retirement with 4 per cent. interest compounded annually.

Applicants must submit with their applications their unmounted photographs, taken within two years, with their names written thereon. Proofs or group photographs will not be accepted. Photographs will not be returned to applicants.

Applicants should at once apply for Form 1312, stating the title of the examination desired, to the Civil Service Commission, Washington, D. C.; the Secretary of the United States Civil Service Board, Customhouse, Boston, Mass., New York, N. Y., New Orleans, La., Honolulu, Hawaii; Post Office, San Francisco, Calif., Denver, Colo.; Old Customhouse, St. Louis, Mo.; Administration Building, Balboa Heights, Canal Zone; or to the Chairman of the Porto Rican Civil Service Commission, San Juan, P. R.

Applications should be properly executed, *including the medical certificate*, but excluding the county officer's certificate, and filed with the Civil Service Commission, Washington, D. C. without delay.

The exact title of the examination, as given at the head of this announcement, should be stated in the application form.

The effect of fruit juices in the mouth is now quite clearly understood. The common expression that a taste of orange or apple makes one's mouth water means that these mildly acidic fruit juices have the peculiar power to stimulate salivary flow.

More than that, it means that the saliva which responds to this stimulation is frequently more normal than was found in the same mouth during the pre-stimulated period. This is one of the chief reasons why fruit should form a part of each meal, why each meal should open and likewise close with fruit.

It produces a copious, fluid, alkalin saliva which is so essential in order that the oral cavity may function properly.

Latterly various investigators have found that dentifrices should be mildly acidic like fruit to assist nature in maintaining a normal saliva. Thay have, moreover, proven that alkalin mouth preparations are contra-indicated in the mouth and should be abandoned because they oppose nature in maintaining oral secretions.

The most universally used acid dentifrice is PEPSODENT. It is endorsed by many in the professions and used daily by millions because it stimulates salivary flow in a manner similar to fruit.—Adv.

Ohio—State

Be sure to notice announcement and preliminary program published in this issue—and get ready to go! We want that additional 15%.

Dr. G. M. Dickason has been appointed head of the new division of dentistry to be a part of the Memphis, Tenn , department of health All services are to be free to the children, and will not be restricted to school children.

Easy Flowing

IF this torch could talk it would say: "Williams Gold Solder flows easier than other solders I've worked on—and it makes a stronger joint without 'burning through'."

Williams Gold Solders combine the proper fusing-point with great strength; are hard but not brittle, perfectly match the work and possess the highest gold content at the least possible cost.

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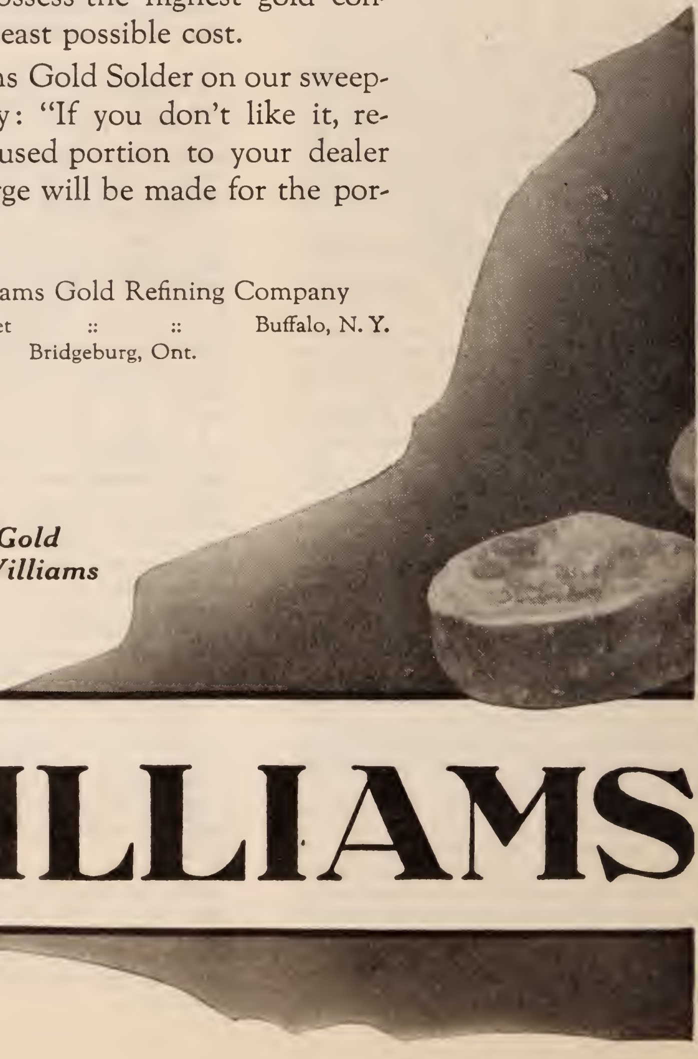

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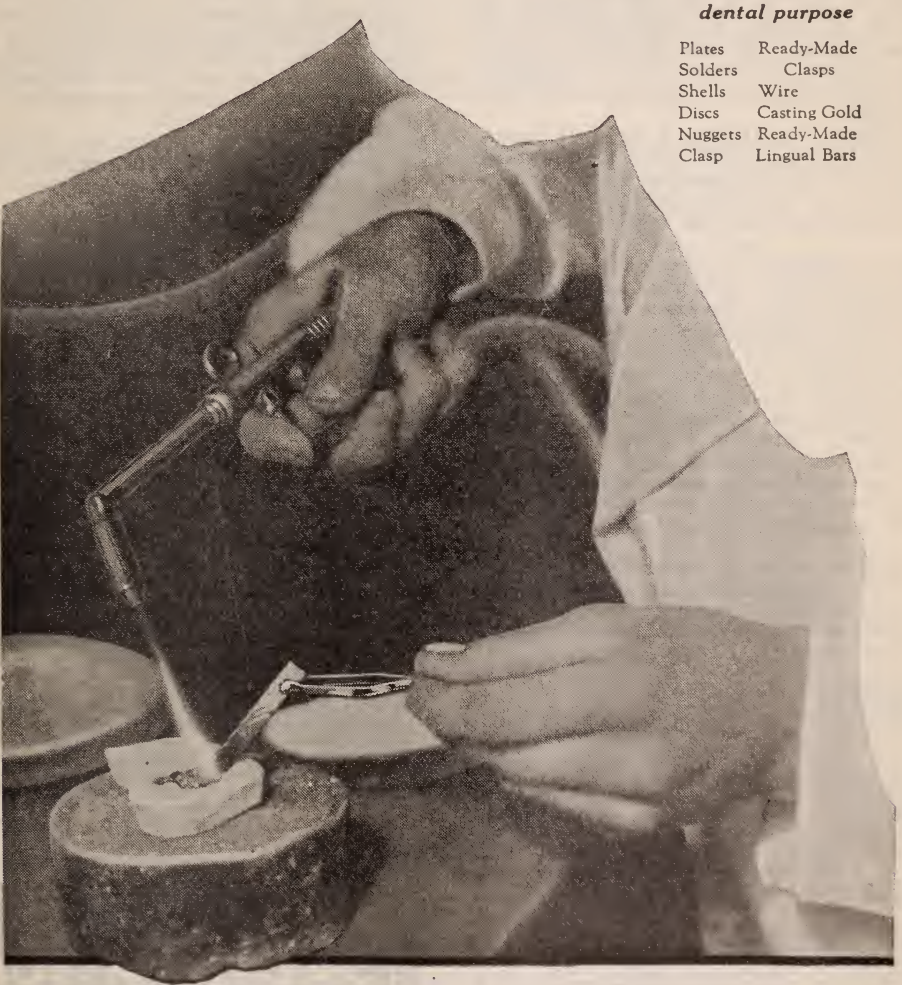


DENTAL GOLDS

DEATHS

At Pittsburgh, Pa., September 13, Dr. A. T. Jarrett, aged 70.

At Denver, Colorado, October 8, Dr. Edward A. Kartack, formerly of Springfield, Ill., of paralysis, aged 45.

At Quincy, Ill., September 26, Dr. Edgard M. Robbins, aged 79.

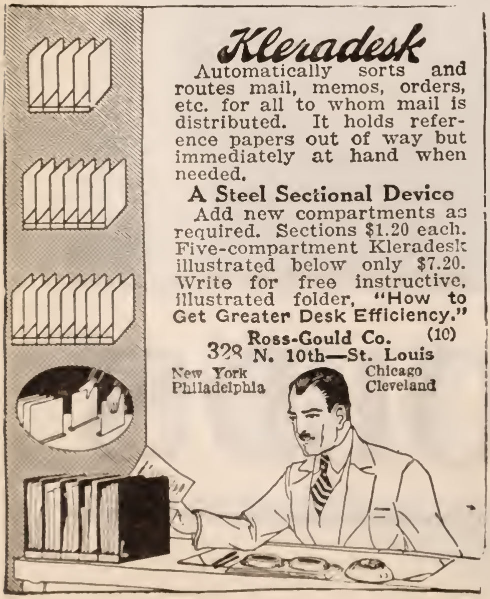
At the county farm near Varysburg, N. Y., October 4, Dr. C. E. Keeler, formerly an Attica, N. Y., dentist, who had been an inmate for many years. He was about 80, and no trace of his relatives is to be had If this comes to the notice of any of them, they will please take notice.

At Norfolk, Va., October 2, Dr. J. D. Ennis; suicide by gas route. He was well known and popular. Ill health is given as the cause.

At Anderson, Ind., September 26, of typhoid, Dr. William Guy Brauchla, aged 28.

British dentists are very loath to resume fraternal relations with Germany, on the ground that every advance in science was used by the latter in the prosecution of the late war. "If men must fight let them fight with artillery, not with science," is the position taken by the English profession, not without full warrant, as it seems to me. Germany must approach the portals of fraternity in a repentant mood, to say the least. Every principle of professionalism was so blatantly and brutally violated by that country that any recognition extended must be regarded as a charity, not a right.

During the month of September the Wheeling, W. Va., dental clinic under the supervision of the Associated Charities, performed 389 operations for the children of indigent parents. Total operations for the year, 3,248.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Dental Complaint Dropped

Oct. 11—The Federal Trade Commission has dismissed a complaint brought by it in 1919 against the American Dental Trade Association, the Dental Manufacturers' Club and the American Retail Dental Dealers' Association charging them with stifling competition in interstate commerce.

The sixth consecutive year of the dental clinic in the Findlay Ohio public schools has begun. Examination by the City's dentists and the dispensary work will soon follow—all free of charge to the pupils and at an exceptionally low cost to the board of education.

Clinic work at the Washington school operating room will commence directly after the several examinations have been completed and the clinic cards returned.

Dr. J. H. Boger has been reappointed dental supervisor for the sixth censecutive year and Dr. Merlin C. Miller the dental operator.

The dental clinic has become an established fixture in the city's schools. Started virtually as an experiment, it has become as important a part of school life as is the teaching of any of the subjects that comprise the curriculum, until now it is considered indispensable. The dental clinic has proven that it is wholly worth while.

As we go to press word comes of the death of Mrs. Georgianna Hood, president of the John Hood Company, of Boston. on Wednesday, October 19, 1921. Her associates will please accept our sympathy.

Classified Advertisements under this heading, $2.00 each for 60 words or less; additional space 2 cents per word, single insertion; three insertions or more special rate on application.

FOR SALE—Modern office, all mahogany equal to new; in one of the best locations in fine residence district in Toledo; practice $8000. Complete equipment including laboratory. Low rent. Price, $2000; half cash. If you mean business and have the money, address THE DENTAL SUMMARY. 1110-C

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THE DENTAL SUMMARY
THE MAGAZINE THAT HELPS

Vol. XLI December, 1921 No. 12

THE RELATION OF MALOCCLUSION OF THE TEETH TO THE PROBLEMS OF TOOTH CONSERVATION*

BY L. H. WIRT, D.D.S., SOUTH BEND, INDIANA

ACCORDING to the census reports, the American people are dying about a year and a half earlier each decade. We have been told by Dr. Mayo that "The first step in preventive medicine lies in the mouth."

Dr. Henry A. Cotton, medical director of the New Jersey State Hospital for the Insane, has reported that the proportion of discharges to admissions has increased over a period of ten years from 42 per cent. to 80 per cent. by the elimination of infections. In other words, if sources of infection are removed, 80 per cent. of the patients recover.

We have been told repeatedly in the past few years, that the mouth and particularly the teeth are one of the most prevalent sources of infection. The public has become aroused to the necessity for diligent care of the teeth; and there are more people who seek the services of the dentist today than ever before; but in most cases they come too late. They come for repair when they should have come for prevention.

Since a large portion of dental operations of ten years ago are no longer considered good practice because of the discovery that disease comes from root-filled and pulpless teeth and therefore must be extracted, we are left no other alternative but to turn our attention to preventive dentistry.

Many of our most faithful patients come to us three, four or even six times per year, and still require our constant attention. In spite of all they can or will do their mouths do not remain in a clean condition. The teeth decay and we patch them up with amalgam or perhaps a crown, and in a comparatively short time our beautiful work falls out, or a crown or bridge gives trouble.

It shall be my purpose in the short time at my disposal to point out to you how large a part of these failures of our efforts is borne by malocclusion of the teeth, and to suggest some means by which we can at least in some measure seek to prevent this defect.

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*Read before the Indiana State Dental Association, May, 1921.

Some one has said that manufacturers of artificial teeth in this country produce over one hundred millions of artificial teeth annually, that go to replace natural teeth which, if proper care and attention were given children's teeth, never would have to be lost.

I know of no more practical or far-reaching influence for the welfare of the rising generation than the Public School Clinic. Through its practice and teachings it reaches into the homes of many who would not otherwise ever hear of the need of attention to the teeth until after they have begun to ache and cannot be saved.

I believe we should exert our influence as a profession to secure the adoption of the school clinic idea in every town, village and hamlet; but to secure the best results from the school clinic, it should be necessary that a child be obliged to show on his report card that his teeth are in proper condition before he is passed from one grade to the next.

In the daily practice of the average dentist, a large proportion of the teeth that he is asked to repair have become so badly involved that he must entertain some doubt of the probability of making his restorations permanently satisfactory. In the event that they have to be extracted, it means not only the loss of the tooth or teeth immediately involved, but the impairment of the whole denture. And right here I wish to say that it is my belief that throughout the whole history of the dental profession there has been too little consideration of the denture as a whole. We have been thinking too constantly of the individual tooth, and forgetting that the tooth is not the organ of mastication but simply one member of the complete mechanism which includes the jaws, the muscles, the connective tissues, nerves, glands, etc.

Dewey has defined malocclusion as: "The deviation from normal occlusion to such an extent as to interfere with normal function of the teeth." It may be said that virtually every deviation from normal harmony will surely impair function.

According to Dr. C. P. Wood, a noted periodontist of Detroit, "Malocclusion is responsible for more serious troubles of the masticatory apparatus than all other causes put together." "It means disease of the teeth and their holding tissues, in direct ratio to the extent of the malocclusion."

One of the most important measures for the prevention of malocclusion is the school clinic. The medical and dental inspection of children in the public schools has demonstrated that these clinics are a sound investment, in that they are the means of raising the health standard of all children coming into their care, and decreasing the amount of money necessary to spend per child for education.

The increased value to the community of every child whose health has been benefited thereby, is incalculable.

Lischer as long ago as 1912 stated that, "fully fifty per cent. of the children in every community are afflicted by some form of malocclusion of the teeth." Last year the estimate based on a survey in Bridgeport, Conn., showed over ninety per cent. In a recent examination of Boy Scouts by myself, out of about 700 examined only fifteen were found to have occlusion that was near enough normal to be negligible.

By far the greatest number of these cases were in my judgment due to the loss of teeth. Loss of the six-year molar led the list, and loss of deciduous teeth by caries probably could account for nearly as many.

If these figures may be taken as approximately correct, they indicate that there is a very noticeable increase of this defect, and as it has been shown that it impairs the efficiency of the masticating apparatus, it follows that malnutrition, lowered vitality and retarded development, both physically and mentally, may follow. Under-developed dental arches are practically always accompanied by faulty development of the nasal passages, which means also impairment of health from insufficient oxygenation of the blood, irritated membranes in the nose and throat causing deafness, nasal catarrh, bronchitis, and other affections. The accompanying under-development of the internal structures of the face and cranium not only lead to disfigurement of the features, but are known to account partly at least, for deficient mentality and moral delinquency.

If these facts are true and there is plenty of evidence to prove that they are, is it not time that the profession should bestir itself to the need of giving more attention to the prevention of malocclusion and to its correction? Does it not appear that the dental colleges should lay more stress upon this subject and prepare to give more comprehensive training in it to the undergraduate?

Information that I have been able to gather leads me to suppose that very few schools have in the past attempted to give more than the merest smattering of instruction in this branch of dentistry, and if one may judge by the results of treatment attempted by those dentists who undertake it without special training, the little they do teach is, more often than not, incorrect, and based upon a wrong conception of the underlying principles of orthodontics.

I, for one, freely confess that I received very little instruction in orthodontia during my college course, but like other graduates fresh from college, without realizing my ignorance, undertook the treatment of cases almost from the start, and through good fortune more than good sense, was spared any very serious failures. It was only after taking a post-graduate course in orthodontia that I realized that there is a great deal more in the subject than is taught in dental colleges.

It is significant that at the recent meeting of the American Society of Orthodontists a committee on education reported a plan by which, with the cooperation of the Dental Faculties Association, a more comprehensive undergraduate course in this important subject would be introduced in the schools of dentistry. This, if carried out, will eventually improve the situation. The dental graduate of the future will not evade his duty because of a feeling of ignorance of the subject. It is not to be supposed that every dentist will undertake the correction of cases of malocclusion in his practice, but he will at least be in position to use such intelligent measures in the care of children brought to him as will prevent the development of a large percentage of cases by early recognition of their incidence.

Since the loss of the six-year molars is charged with the responsibility for most malocclusions, it is gratifying to observe that in the various school clinics especial attention is given to the preservation of these teeth. It is earnestly to be hoped that school boards will more and more awaken to the value of these clinics and enable them to still further enlarge their scope by additional school dentists and nurses. In Bridgeport, Conn., where very thorough work has been done over a period of about six years, it was found that by attending to the children in the earliest grades first, the result was that in a few years the work could be confined to these grades, as the benefit accruing by early care was reflected in a higher percentage of healthy mouths in the higher grades each succeeding year.

If I have dwelt at undue length upon the foregoing phases of the subject, it has been for the purpose of laying before you the urgent importance of malocclusion in the group of underlying causes of failure in conservation of the teeth, and to interest you in means of prevention.

Going more into detail, let us consider the various aspects of the relation of malocclusion to the interests of those practicing general dentistry. It is self-evident that a patient whose teeth are in abnormal position in the arches, rotated, lapping over one another, cannot of his own efforts keep them as clean as he could if they were in normal position. The proximal contacts do not lend themselves to self-cleansing; food is caught between the teeth and held there to decompose, the gums become irritated by the constant presence of this decomposing matter and by the hammering of unnatural stresses in mastication, and afford unexcelled fields for the growth of bacteria. The crowding of the teeth also lessens the vitality of the bony septa between the roots of the teeth by impeding the free circulation of the blood. These very thin plates of bone are much more readily broken down by the necrotic action of the pus in pyorrheal pockets, permitting the teeth to become loose.

In the treatment of pyorrhea the periodontist will surely tell you that where malocclusion exists the prognosis is not hopeful. Therefore, as malocclusion predisposes to pyorrhea and precludes its cure when already present, does it not follow that the prevention or early treatment of malocclusion is one of the most important factors in tooth conservation?

Another way in which this condition may affect the results of our efforts to serve our patients is in its relation to the various kinds of restorations; the plastics, cast fillings, crowns or bridges.

One of the cardinal points in the technic of all fillings is the restoration of all tooth contours, special attention being given to the interproximal contact points and the marginal ridges.

Where the teeth are crowded, overlapping or out of proper alignment in the arch, it is practically impossible to make restorations that can be relied upon to give permanent service. The Black method of cavity preparation, extension for prevention, was based upon teeth in normal position. It may be extremely difficult to carry out in cases where there is crowding and overlapping of the teeth. In many of these cases it is impossible to rebuild the normal occlusal surface with proper marginal ridges without risk of the stresses of mastication tending to dislodge the filling or cause disturbances in the peridental membrane.

It is becoming more universally recognized that all crowns and bridges should be constructed with a view to correct occlusal surfaces. This can be done only by the use of correct impressions of both arches and models of the full case set up on a good anatomical articulator, which should be adjusted to the jaw movements of the case in hand as indicated by the occlusion in the case. This permits forming the occlusal surface accurately including all the inclined planes, grooves and ridges, giving an efficient masticating service and preventing the fibres of food from lodgment between the teeth to the injury of the gum papilla.

Whether the crown or bridge is constructed in this way or not, it is often impossible to restore the occlusal surface to usefulness if the teeth are not in normal alignment, and this is another reason why normal position is necessary to the elimination of failures in reconstructive dentistry. Deviation from this principle is responsible for many of the failures of this class of restoration.

Everyone is familiar with the drifting of teeth that have been deprived of their natural support by the extraction of an adjoining tooth. The most conspicuous examples of this are the molars which tip forward farther and farther the longer a vacant space remains in front of them. You have all seen examples of bridges affixed to such teeth and which have failed to give the length of service expected of them. Unfortunately, they are not always the handiwork of the man across the street; too often they have been made in our own offices and have returned to us like boomerangs to make our lives miserable, not to mention the disappointment to the patient.

It may safely be taken as a reliable guide to daily practice that no bridge affixed to an abutment that is not in normal position can be expected to give permanent satisfaction. It is enough to expect a tooth even in normal position to do the work of one or two others; but how we can expect this of a tooth that has tipped over so far that its own welfare is in jeopardy from excessive and abnormal stress, it is difficult to comprehend.

No intelligent engineer would think of building a railroad bridge where like conditions exist. His plan calls for abutments well placed and braced to carry the greatest load it will ever be called upon to sustain. And he surveys the grade to give a rising slope toward the bridge from either direction in order that the momentum of fast heavy trains may relieve the strain of their weight. Dental engineering is no exception, and the interests of patients will be served best by avoidance of all fixed bridges where the occlusion of the abutments is not normal, and where the occlusal surfaces of the abutments as well as the span are not formed to reproduce the natural shape of the original teeth.

Would it not therefore be eminently practical for dentists not only to exercise care in the choice of cases where fixed bridges are contemplated, avoiding such restorations where the occlusion does not warrant them, but also to advance the prestige of the profession for the future by using all possible measures for the prevention of malocclusion in the generation now growing up?

In the construction of artificial dentures the success or failure is often determined by the malformation of the jaws accompanying malocclusion, and the changed muscle-action due to that deformity.

Where there has been throughout the lifetime of the patient a habitual jaw movement developed by the abnormal occlusion and suited to that deformity, it is to be expected that the patient will have more or less difficulty in becoming accustomed to a denture that has been constructed with the teeth set in ideal occlusion. The movements of the jaws in mastication are partly involuntary or unconscious, and the motor impulses supplied to the muscles have become more or less fixed or habitual, and any change in the relative position of the teeth that are supplied will necessitate the cultivation of a new set of impulses. In this way we may account for the difficulties experienced by many patients in learning to use their new teeth.

The question arises at this point, whether in these cases the denture should have been constructed to conform with the malocclusion which originally existed, or with normal occlusion restored fully, and the difficulty overcome by persistent effort.

I would rather leave this question to be answered by those whose specialty is the construction of dentures; but if I might venture an answer, I would suggest that it might be best to adopt a compromise to some extent, setting the teeth with a mere suggestion of the original malocclusion especially as regards the anteriors, because if it was very bad, the sudden change to completely-normal alignment probably would not meet the approval of the patient nor his associates. Bearing in mind the difficulty that may be experienced in accustoming the muscles to a slightly changed set of movements, there usually will be a willingness on the part of the patient to cooperate and exercise patience, not expecting too much at first.

The above suggestions have more especial reference to those cases where there has been a malocclusion of Class I (Angle), in which the principal feature is faulty alignment of the anteriors.

In cases where there has been a malocclusion of Class II, division I, a pronounced protrusion of the anterior uppers with a short upper lip, it is often necessary to surgically remove the anterior plate of the alveolar process in order that the denture may be seated farther back and the protrusion overcome.

In Class III cases, or protrusion of the lower arch, very little can be done in most cases to overcome the abnormality, and the teeth will have to be set in somewhat the same relation as the natural ones had.

In all of these conditions there is the changed muscular activtity, which in many cases will affect the success of the denture.

The main purpose that has been served in bringing these matters to your attention has been the hope that by pointing out some of the difficulties attendant upon service to patients in whom malocclusion is present, I might impress upon your minds the extreme desirability of taking more interest in the prevention of this deformity.

This calls for early recognition and a due regard for our responsibility for the welfare of families who come to us for service. It seems to me as a profession we have not fulfilled our full duty if we have simply done what we are asked to do, and failed to call attention to such serious matters as the things that lead to these deformities.

It would surely be embarrassing to any of you if after you had dismissed a patient as finished, the patient were to say "Doctor, here is another cavity that needs filling." Should it not be just as embarrassing were a mother to say to you after you had filled all the cavities in her child's teeth, "Doctor, I think Freddie's teeth need straightening"?

Kreggarman, of New York, says: "Occlusion, although originally serving only as the basis of orthodontia, is now becoming recognized as the basis of all dentistry." Whether or not the general practitioner ever practices orthodontia, it is essential for his professional reputation that he know the landmarks of normal occlusion, and that he be able to recognize a deviation or malocclusion in its very incipiency, that he guard against the premature loss of the deciduous teeth and the prolonged retention of the temporary teeth, and guard the first molar from caries.

Singleton says: "People aren't born with false faces, but get them after they grow up, and growing up with a motley array of human teeth in the mouth puts a cartoon on your shoulders instead of your naturail face."

I wonder how long it will be if the increase in facial deformities continues at the present rate, before the cartoonists begin to draw pictures of people with normal features, as being more likely to seem exceptional.

There is absolutely no reason for the assumption held by some dentists that the "irregular teeth will straighten themselves," or that the correction of a malocclusion should not be attempted until after the permanent teeth have all erupted. The proper time to begin preventive measures is before the child has erupted any teeth at all. First, *it is desirable that there be established a closer relation between the dentist and the families that he serves so that he may have opportunity for advisory service to mothers even before the child is born.* There should be a close cooperation between the dentist and the pediatrist. It is not enough that the physician prescribe the diet and care of the child without the collaboration of the dentist. The child must be breast-fed if at all possible. If physicians realized the relation between the artifical feeding of infants and the development of defective dental apparatus they would not be so complaisant with mothers who do not want to nurse their infants.

In the case of those who cannot be prepared to nurse their babies, there should be a decrease in the sugar content of the artificial food that is given, and rigid instructions should be given and enforced, that the child never should be placed on its back and given its bottle to hold by itself, thus placing the weight of the bottle and its contents on the chin and inevitably producing a malocclusion of Class II, by the daily pressure on the anterior part of the lower jaw.

Another practice which I am told is far more prevalent than supposed, is that of the nurse who, almost as soon as the child is born, deliberately places the child's thumb or finger in its mouth to keep it quiet. There is no habit that is more conducive to distortion of the jaws while developing, and none that is more difficult to break. Close watch should be kept for mouth breathing and its causes eradicated. As soon as the child is old enough to begin the eruption of teeth it should be given something upon which to exercise its jaws. A chicken thigh bone is an ideal teething aid.

The child's diet should be arranged not only with reference to caloric content, but also with proper attention to the vitamins and the mineral substances that are necessary for the growth of strong, well-calcified teeth, and there should be provision for foods that require plenty of chewing. The soft pulpy foods that are so common today are in large measure responsible for the increase of malocclusion in the rising generation.

With these precautions and a close watch for any decay of the temporary teeth, there is good reason to expect most children to develop good teeth, there is good reason to expect most children to develop strong jaws, well formed and affording ample room for the teeth to erupt in the positions Nature intended. There will then be less difficulty in making such repairs to the denture as may still be necessary.

WHAT REMOVABLE BRIDGE-WORK HAS DONE FOR DENTISTRY*

BY R. M. BONDY, D.D.S., CHICAGO, ILLINOIS.

BEFORE READING THIS PAPER I wish to acknowledge my indebtedness to Dr. Bert Kershaw, of Chicago for the historical data and many of the facts contained herein. I also wish to state that my title is somewhat ambiguous, as my reference to what removable bridge-work has done for dentistry, while applying to all forms of removable bridge-work, refers in this paper, solely to the Roach cast-clasp technic.

According to dental history, bridge-work had its beginning in 1877, when Beer's patented gold crown appeared. This was taken over and demonstrated by Dr. C. M. Richmond in 1878, and from this developed fixed bridge-work, in the early 80's. Even at this time, there was a deep-seated conviction that this class of work was inadequate in a great number of instances, and this conviction was confirmed in a lecture at McGill University by Dr. J. Hunter, of England, in which he characterized certain classes of crown and bridge-work as ''American Septic Dentistry.'' This caused an awakening in the dental profession such as had not been experienced in years.

Up to this time all bridge-work had been constructed in a more or less haphazard manner and included anything from a single dummy hung to a gold crown, to a full upper denture suspended from a pair of third molars and a couple of laterals. At this time removable bridge-work was unthought of or was represented in its embryonic state in the form of partial plates with clasps.

However, all this has changed, and in this day of preventive or constructive dentistry, instead of devitalization of pulps for the purpose of installing a fixed appliance, with its sequence of focal infection, the great trend of good practice is toward pulp conservation and the construction of attachments for vital teeth, of which there have been a great number shown at our recent clinics. Some of them are very ingenious and have done wonders toward eradicating much of the trouble caused by the old septic appliances.

There is no work in dentistry that gives more satisfaction both to the operator and the patient, than the restoration to health and beauty of a misused and unhealthy mouth by the proper installation of a properly constructed bridge, be it either fixed or removable; but, mind you, it must be properly constructed and accurately placed.

Dr. Edward T. Tinker, of Minneapolis, in a paper read before the 23rd Annual Session of the National Dental Association at New Orleans, summarized the causes of failure in bridge-work, removable and fixed, as follows:

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*Read before the Tennessee State Dental Association, Nashville, May, 1921.

First. Faulty and in many cases no attempt at diagnosis and prognosis.

Second. Failure to remove foci of infection and inattention to treatment and care of the investing tissues and mouth sanitation.

Third. Disregard of tooth form.

Fourth. Absence of proper embrasures.

Fifth. Absence of contact points and interproximal spaces.

Sixth. Faulty occlusion and articulation.

The dental profession seem to be divided in opinion as to fixed and removable work, one division maintaining that removable work is the only fit type to be placed in the mouth, while another group is just as sanguine that fixed work is the only kind that adequately fills the bill; while the real facts of the case are, that each variety has its place and should be used where indicated, and it is here that the conscientious dentist who wishes to serve the best interests of his patients should exercise his judgment in determining which type is adapted to the case in hand, and then construct it according to the best technic for that particular case.

The first step, where bridges are to be constructed either fixed or removable, is an X-ray and articulated models which are made by taking a mush-bite in modeling compound. These are essential.

The X-ray shows faulty root fillings and foci of infection as well as determining the extent and density of the bony process surrounding the teeth which will be required as abutments, also the direction and inclination of roots, some of which may have to be extracted, thereby altering your plan of procedure.

The study-models are invaluable in determining which class of work will be most applicable to the case in hand and help you to form a mental concept of the finished work. These models will also indicate the stress of occlusion and show you where, perhaps, certain teeth will have to be ground down or where, in some cases, the bite may have to be opened in order to obtain a well-balanced occlusion, or teeth which have become elongated through lack of occlusion may have to be extracted. In any case good sound judgment is essential to success.

In my practice, I have used from time to time several of the different forms of ready-made attachments on the market for removable work, and for the most part have discarded them, as my experience with a number of them is that they are first-class slow extractors, and I have finally settled down to the use of the cast-clasp technic, almost exclusively, following the technic given by Dr. F. E. Roach.

The reasons for my choosing this technic are many. In the first place its simplicity and practicability appeal both to the operator and the patient. You do not have to depend on inlays and crowns which in turn are dependent on cement for retention. It requires no destruction of healthy tooth structure and in many cases where there is natural spacing between the teeth, especially the upper anteriors, it is the only method I have found where a natural restoration can be made. Every operation is a success only as it leaves the mouth in the most favorable condition possible.

It is needless for me to enumerate the short-comings of fixed bridge-work. Many of these short-comings are due more to the lack of skill and judgment on the part of the operator than to the appliance itself. The average dentist is not to be blamed if he adopts the methods which are chiefly practiced in his region and which he regards as safe and sane. He may feel that to experiment with something new would be jeopardizing the welfare of his patients.

No doubt the three-quarter crown, Carmichael attachment, the inlay attachments and other attachments, in the hands of men who have mastered them, have their places and many beautiful and serviceable fixed bridges are being made; but in each case it requires cutting into healthy tooth structure and putting dependence on cement. In many cases, in a short space of time, we have loosening of these attachments or decay around them with the result that devitalization becomes necessary. Why court trouble when it is unnecessary? In practically all of these cases the cast-clasp technic can be used with the elimination of these worries to both the patient and the operator.

As stated before if a correct diagnosis is made and the operator can have the cooperation of his patient, removable bridge-work will be a success, providing the operator has mastered the technic. The patient must be made to realize that after the bridge is placed in his mouth the success or failure depends on the care he gives the teeth supporting the bridge. If the patient is lax in keeping the appliance, or the teeth supporting it, clean, the operation will be a failure; but this can in no way reflect anything detrimental to the appliance, and this class of patients do not deserve the consideration of the conscientious operator who has tried to render constructive service. Fortunately, however, the majority of patients appreciate this class of service and do their part toward making the operation a success.

Many of the best men in the profession who have done such wonderful work in preventive dentistry along the lines of pyorrhea and prophylaxis have come to the conclusion that 50% of pyorrhea is caused by malocclusion due to the loss of the teeth in the opposite jaw. We have seen many of these cases where there was a molar or bicuspid missing and have seen the elongation of the teeth opposite, with the resultant loss of occlusion and contact points. In most of these cases we find pockets which are the breeding places of infection.

Patients come to us and ask us to remedy these conditions by supplying the missing teeth. The conscientious operator has many times refused to perform this operation, knowing that in doing so, it means the destruction of some of the good teeth in order to replace the ones missing.

At other times we have gone ahead, easing our consciences by saying to ourselves, "Well, I have made the best of a bad condition and feel that in restoring the occlusion I have chosen the lesser of two evils." In these cases, in my humble opinion, removable bridge-work is the ideal solution of the problem.

Again we run across cases where there is a decided space between the centrals and laterals, especially in the uppers; one or more of these teeth will be missing. In the past it has been necessary to devitalize one or more of the pulps on either side of the space in order to swing in the missing tooth, or to use an attachment where it was necessary to fill up the entire space between the teeth. The result was an unnatural appearance, the bridge being unsightly and not coinciding with the natural teeth. Again the removable bridge with the cast-clasp technic finds its ideal place.

Another feature which appeals to the patient is the fact that no grinding or preliminary work is necessary on the teeth where these bridges are placed. Many times a patient is in need of bridge-work to restore normal occlusion and mastication and when advised of this will say, "Doctor, I would rather go without those teeth than go through the torture of having my teeth ground for a bridge," or, "I am not in favor of multilating my own good teeth for the sake of supplying one or two missing ones." Here is where the removable bridge comes into its own, for when we explain the advantages of a removable appliance, the fact that it can be put in without multilating good teeth and without discomfort to them, in nearly all cases, the patient is glad and anxious to have the restoration made.

We all know the harm done by the old-style clasp used on lower lingual-bar plates, how the constant rubbing of the clasp on the tooth soon caused soreness of the teeth and wearing away of the enamel causing the necessity of filling. In order to make the old-style clasp work successfully, in nine cases out of ten, it was necessary to devitalize the pulp and crown the tooth supporting it, because of the irritation to the pulp caused by the rubbing of the clasp. We also know that the soft tissue often presented a hyperemic appearance caused by the rubbing of the plate on the tissues around the natural teeth left in the mouth. The use of the cast-clasp has absolutely done away with this trouble with partial plates. If Dr. Roach's cast-clasp technic is never used for any appliance but the lower lingual-bar plate, the profession owes him a debt of gratitude for this wonderful attachment; and I venture to make the prophesy that when this comes into universal use, as it surely will, his name will go down along with other men in dental history who have helped to elevate the profession.

In making a brief summary of what removable bridge-work has done for dentistry, permit me to suggest the following:

First. It has done away with devitalization or the necessity of cutting into healthy teeth for the purpose of bridge attachments.

Second. It has done away with practically all discomfort to the patient in operations requiring restorations of this kind.

Third. It has given us an applicance which can be kept absolutely sanitary.

Fourth. It has given us an opportunity to restore normal occlusion and a natural appearnace in places where fixed bridges could not be placed without detriment to the appearance of the patient's mouth.

Fifth. It has given us an opportunity to do real constructive dentistry.

Removable bridge-work has come to stay because of its practicability both from the viewpoint of the operator and the patient. There are places where it is indicated above all other appliances as I have stated before. Surely any technic which tends to do away with the unpleasantness of a dental operation and which really helps us toward the constructive rather than the destructive in dentistry is an adjunct to our profession, and I firmly believe that these facts are true of cast-clasp removable bridge-work, if used in its proper place and with good judgment, and a correct technic is followed by the operator.

153 West 69th Street.

Swaging With Moldine

Facings are easily backed with pure gold by the following swaging method: Grind the facing to the desired form, select the backing and cut it to allow a little for trimming. Force it over the pins in the desired relationship. Then wrap facing and backing in a little tissue paper, imbed all in moldine, place this in the S. S. W. swager or a similar device. A light blow from a hammer will give perfect adaptation without any danger of fracturing the facing.

—*F. W. F. Hettinger's Dental News.*

THE ADVANTAGES AND DISADVANTAGES OF PORCELAIN JACKET CROWNS*

BY C. W. HOFFER, D.D.S., NASHVILLE, TENN.

CROWNS ARE MOST ESSENTIAL in dentistry, and for this reason many kinds have been introduced to the profession, and many technics have been given as a correct way to make a properly-fitting crown, but none had been given that eliminated the overhanging margins, or that fit all depressions and irregularities of the neck of the tooth, until the porcelain jacket crown and the shoulder metal cast or swaged crown were introduced.

The porcelain jacket crown has been given to the profession with the idea of inspiring better work. It has been given to us as a crown nearest reaching the point of perfection. It has more and greater advantages both to the patient and to the dentist, than any previously known crown, yet it has its disadvantages; but they are only to be discussed as points contra-indicating a porcelain jacket crown. With the porcelain jacket crown you are given the great advantage of the use of a crown in the anterior parts of the mouth, giving your patient the finished tooth, having an esthetic value never before known—its contour, its size and color, even to the developmental lines, white spots, and any other formation peculiar to that one mouth, reproduced in every detail. Its esthetic value, not only in anterior parts of the mouth, but in posterior parts as well, is an advantage not surpassed.

As a crown nearest reaching the point of perfection, its greatest advantage being in our ability to secure a union of crown and tooth that is free from the overhanging margins, free from failure to fit the depressions and other irregularities so frequently found at the necks of teeth. Therefore, with the porcelain jacket crown we are able to insert a crown that will meet with the demand of our prophylactic men, in the way that we give them a mouth free from irritating, non-fitting margins, and a crowned tooth that they can carry into effect their curetting of pockets and polishing of the necks of the tooth without being troubled with the obstacles we all know they find in such work around teeth carrying other kinds of crowns, such as a shell, Richmond, cast or ground joint, *or cast shoulder crown*. You can make this union so nearly perfect that with the most delicate explorer you can only detect the slightest noise in passing over the joint. Again, porcelain is tolerated more kindly by the soft tissues than any other material; therefore, with such a union of tooth and crown, and a crown free of all metals greatly eliminating thermal shock, you are doubly assured that you have rendered your patient a real service in the way that you have restored the lost organ without the use of substances that the soft tissue rebels against, and one that will not give harbor to food and calculus, by means of the imperfect union that we have previously been forced to accept in all cases demanding a crown.

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*Read before the Tennessee State Dental Association, May, 1921.

The porcelain jacket crown is a pulp saver. For example: Anterior teeth, deeply decayed, with angles either broken away or too weak to retain a filling. Teeth with the angles broken away by a fall or a blow against the mouth; such teeth cannot be filled or inlayed; they do not offer enough body to retain either; therefore, you are confronted with a problem of devitalizing and inserting a crown with a pin. With the porcelain jacket crown you can save the pulp and give your patient a more natural tooth in appearance and one that gives the hygienic qualities above mentioned. Such advantages as these are surely to be appreciated by those who desire to render service of great value to the health of the patient, beside the replacing of the lost organ.

Nature's contour of the teeth, the grooves and fissures, cusps, contouring of the mesial, distal, lingual walls, all have a purpose in the proper functioning of the dental organs. Therefore, if we practice the principle of the profession of dentistry we must be able to "reproduce broken down or lost organs to their original anatomical form." With no crown are we able to do this only in a limited way. You can cause mining, making your shoulder crown come up to all these requirements; it's true, you can make it more nearly so than you can other crowns, but, with the porcelain jacket crown you can absolutely reproduce each and every peculiarity of the tooth in question, even its color.

The requirements of modern dentistry are greater by far than in times past. We have been practicing the profession only in special branches—orthodontia, exodontia, prosthodontia, prophylaxis and operative dentistry, and if the profession is growing large enough to warrant such, surely it has grown large enough that we all must adhere to the principles of "restoring the organs to their original anatomical form."

Porcelain jacket crowns as abutments for removable bridges are ideal where clasps are to be used as they overcome all its bad features; *first*, you can shape them properly for the retention of the clasp; they also allow for paralleling for multiple abutments, the porcelain being sufficiently hard to withstand the wear of the clasp, and the strength of a porcelain jacket crowned tooth is great enough to endure all additional weight employed, and more than should be carried on any one tooth in the case of any abutment.

With this technic you eliminate frequent occurrences of caries due to fermentation under the clasps, also the hyper-sensitiveness due to friction of the clasps over thin enamel surfaces, and with the highly glazed porcelain it makes it much easier for you or the patient to insert or remove the bridges, with the use of lingual clasps where they show on the jacket crown. You have reached perfection from an esthetic standpoint.

The only disadvantage of the porcelain jacket crown is that it is being used by men who do not understand the technic of preparation and the seriousness of a faulty union of crown and tooth. Such men take impressions and send to the laboratory and get the crown as made by the laboratory, and use it, regardless of the perfection or failure of the joint. Therefore, such porcelain jacket crown work is bound to be a menace and not an advantage. Porcelain jacket crowns were given to the profession to inspire better work, therefore, they should be used only by the men who care for such an inspiration, and in any one else's hands, they have no advantages at all.

In conclusion, the porcelain jacket crown is the ideal crown; it is ideal because it is the one crown that you can make that gives a restoration of all points of contact; perfect match in color; a union that fits all irregularities without giving overhanging margins; a size and contour in accordance with the other teeth of the mouth; strength sufficient for all requirements. One whose technic of making is accurate and must be closely carried into effect, giving gratifying results in the finished product.

Hitchcock Building.

Retention of Gold Inlays in the Morsal Surface of Incisors and Other Teeth

Take 15 ct. or 18 ct. gold wire, 23 gauge, and thread same with threading plate. Drill retention pits in cavity or edge with fissure bur one or two sizes larger gauge than threaded wire. Cut wire into lengths a shade longer than the depth of pits, fill the pits with warm inlay wax, allow to cool, warm the wire pieces, and place in the pits of wax. When cool, draw same, and replace again. Then proceed to form wax inlay model. The threaded wire becomes more firmly attached in the cast gold; also it does not draw out of the wax form when being removed from the cavity or tooth.

—*Percy B. Cohen, Dental Science Journal of Australia.*

THE ANTRUM

BY GEORGE E. HOURN, M.D., D.D.S., ST. LOUIS, MO.

TO PRESENT THIS SUBJECT may be an imposition to many of you. We realize that it is old and almost threadbare, and that it has, perhaps, been thoroughly threshed out on the floor of this society in the recent past. However, in casting about for a topic for this evening's discussion, we could not help but be convinced of the appropriateness of this subject. As dentists and physicians we are more and more frequently confronted by diseases of the antrum. Refinements of diagnosis and our alertness in looking for antral involvement reveal a striking number of cases heretofore unsuspected. Thus it often plays its baneful role as a focus of infection, and contributes its share in undermining the general health and to the physical distress of our patients. Although we are not contributing anything new or original, we trust that this paper and the discussions following, in its review of the subject, may give all of us some ideas that may prove of benefit in the treatment of our patients.

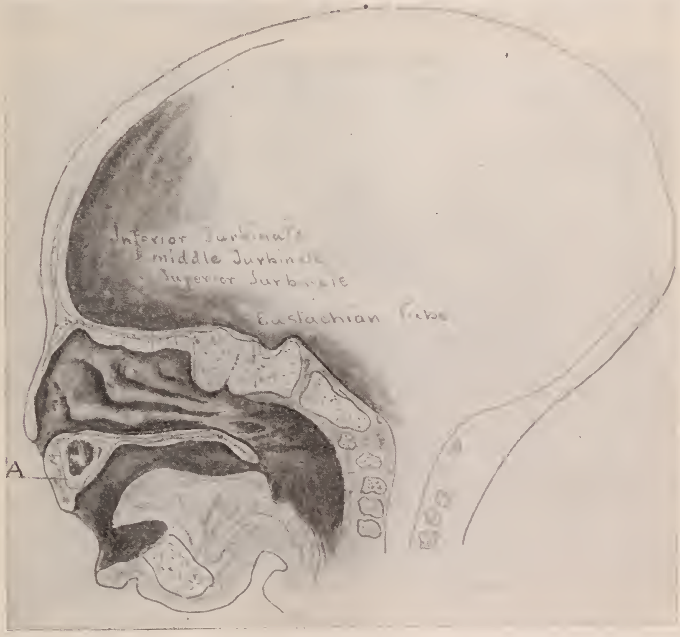

Fig. 1—Longitudinal Vertical Section of Infant's Head. (a) Premaxilla.

The more frequent portals of entry of disease of the maxillary sinus are by way of the nose and the teeth. To more clearly grasp the antral relations on the nasal side, it might be well briefly to review the anatomy of the lateral wall of the nose in an elementary way. As the dentist centers his attention upon the alveolar border and the teeth in their

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*Read before the St. Louis Society of Dental Science, March 15, 1921.

relation to the antrum, so the rhinologist centers his attention upon the lateral wall of the nose in its relation to the antrum as well as the other accessory nasal sinuses. (*Fig. 1*). This wall is divided into three compartments or meati by three horizontal shelves termed the turbinate bones, viz., the inferior, the middle and the superior. These meati are also correspondingly termed the inferior, the middle and the superior; the inferior meatus, being between the floor of the nose and the articulation of the inferior turbinate bone with the lateral wall of the nose; the middle meatus being that portion between the inferior turbinate bone and the junction of the middle turbinate process with the ethmoid bone; and the superior meatus being that portion between the middle turbinate bone and the superior turbinate process. The various accessory nasal sinuses communicate with the nose via the middle and superior meati. The anterior series of sinuses, viz., the frontal, the anterior ethmoids and the antrum communicate by their ostia with the middle meatus, and the posterior series of sinuses, viz., the posterior ethmoids and the sphenoid communicate by their ostia with the superior meatus. Thus one readily can appreciate that a discharge accumulating in these cavities will discharge into either the middle or superior meatus, the antrum of Highmore discharging its contents into the middle meatus. Of course the observer realizes that the secretion seeks the lowest level by the most unobstructed path, so that the discharge may be found in parts of the nasal fossæ other than the two compartments mentioned. The determining factors being the anatomical and pathological conditions present, complicated by certain physical laws, as capillary attraction and gravity.

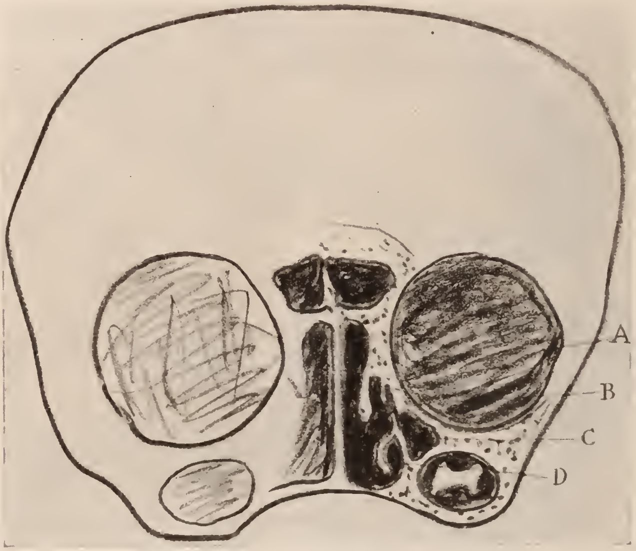

Fig. 2—Coronal Section of Infant's Head at Birth. (a) Middle Turbinate (b) Ostium. (c) Antrum. (d) Inferior Turbinate.

Starting at about the fourth month of gestation, the antrum develops from the middle meatus of the nose as an invagination of the mucous membrane lining of the hiatus semilunaris. This point of invagination then remains as the normal ostium of the sinus. The antrum continues to grow by resorption of the cancellated bone of the body of the superior maxilla and at birth is about the size of a small bean. (*Figs. 2 and 3*). At this time, it is located just internal to the lower portion of the orbit and in the upper portion of the body of the superior maxilla. You will note that the antrum now occupies a relatively high position compared to that of adult life. From this stage on to full size it assumes a close relationship to the teeth. If you will recall the eruption and development of the teeth in infancy and childhood you will note what a large proportion of the body of the superior maxilla is occupied by the tooth follicles and erupting teeth. As the teeth on erupting move downwards into place, the antrum continues to invade the body of the superior maxilla externally and downwards. Thus the blood-vessels and nerves supplying the teeth follow the dental organs in their descent leaving a track in more or less intimate relationship with the walls of the sinus. The resorption and decalcification of the antral walls continue in varying degree throughout life, so that in old age the walls may become very thin and the sinus unusually large. The marked variations in the size and shape of the antrum, and the intimate relationship between the roots of the teeth and the antrum, depend on this factor of resorption. This process may go on to such an extent that only a very thin lamina of bone or only the mucoperiosteum may cover the apices of the roots. The antrum, then, in its full development occupies the greater portion of the body of the superior maxillary bone and lies external to not only

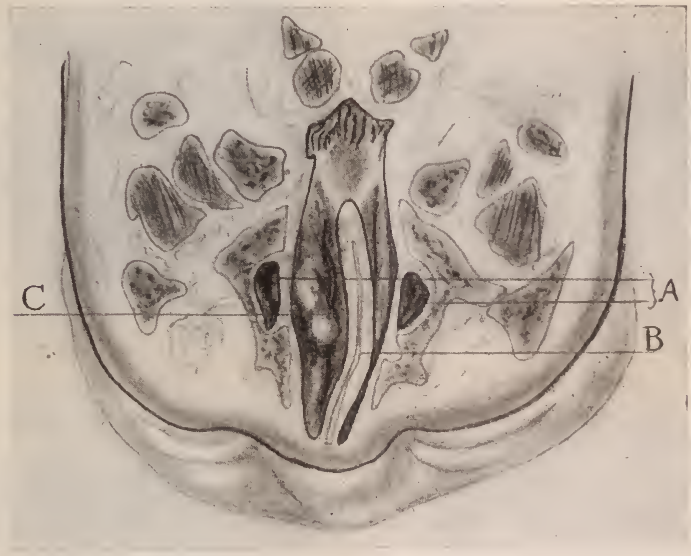

Fig. 3—Horizontal Section of Infant's Head, looking from above. (a) Antrum. (b) Deviated Septum. (c) Compensatory Hypertrophy of Middle Turbinate.

the middle meatus of the nose but the inferior meatus as well. Above, the antrum is separated by a thin plate of bone from another important structure, the orbit. Alterations in the development of the bones of the face due to nasal obstructions, adenoids, mouth breathing, faulty dental conditions, and other factors such as race, climate and habits may also contribute to variations in the sinus.

The typical maxillary sinus is more or less pyramidal in form with the base towards the lateral nasal wall and the apex towards the malar bone. The average capacity in male 16-18c.c., in female 10-12c.c. The average dimensions 3.5c.m. high, 2.5c.m. broad, 3.2c.m. deep. It has five walls viz.: *First* the nasal, *second* the anterior or facial, *third* the superior or orbital, *fourth* the posterior or zygomatic, *fifth* the inferior or alveolar. The *nasal wall* is more or less quadrangular in shape and usually vertical or slightly convex. (*Fig.4b after Skillern*[1]). The inferior edge, as a rule, rounds outward to join the floor or it may dip under the floor of the nasal chamber. Four bones contribute to the formation of this wall, below and anteriorly the superior maxillary, posteriorly the palate bone, and above the unicate process of the ethmoid, and below this the maxillary process of the inferior turbinate bone. The latter process is, as a rule, quite thin and is the point of election for the puncture of the antrum as will be noted further on. About the unicate process bone is lacking, the defect being supplied by the antral and nasal mucous membrane and is therefore the thinnest portion of this wall of the antrum. The normal ostium of the sinus occupies the superior and anterior portion of this wall, averaging about the size of a "buckshot to a pea" and takes a direction upward, backward and inward.

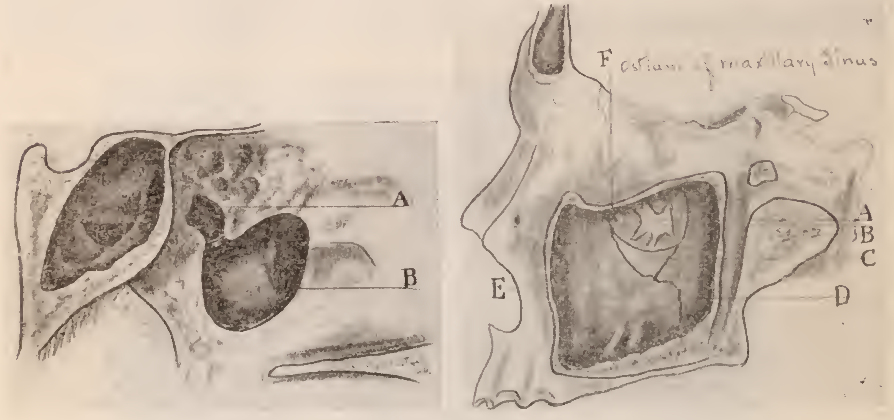

Fig. 4a Fig. 4b

Fig. 4—Prolongation of Antrum into Sphenoidal Sinus. 4 a (a) Sphenoidal Sinus. (b) Antrum. 4 b Nasal Wall of Antrum.

The *anterior* wall is somewhat square and contains the anterior dental canals in which course the anterior dental nerves and vessels. In this wall may be found, at times, the roots of the canine and bicuspid teeth. The follicles of the anterior teeth develop here during infancy.

The *superior* wall is convex in transverse directions and more or less triangular in shape with the base towards the lateral wall. A ridge of bone marks the course of the infraorbital nerves and vessels which dip down into the anterior wall and may form an aqueduct with a small space above it.

The *posterior* or zygomatic wall passes backwards and inwards from apex of antrum in a vertical direction and is usually concave in a transverse direction.

The *inferior* wall is concave in transverse direction and less so in an anteroposterior direction. It is usually uneven, due to the elevations over the roots of the teeth. (*Fig. 5, a and b*). Frequently there are marked depressions between the roots of the molar teeth. Again septa of varying heights may extend in a transverse or more rarely anteroposterior direction, forming deep pockets. (*Fig. 5, c and d*). There is some question as to whether complete septa are found completely

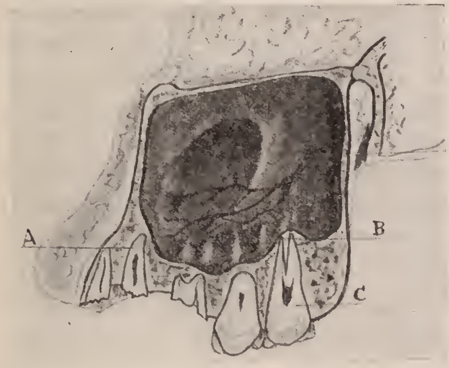

Fig. 5a

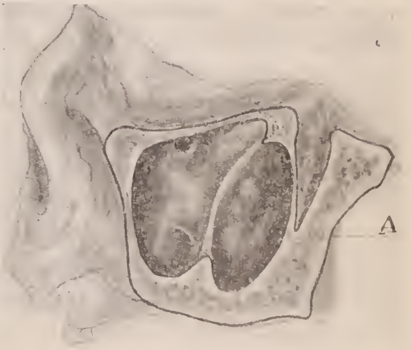

Fig. 5c

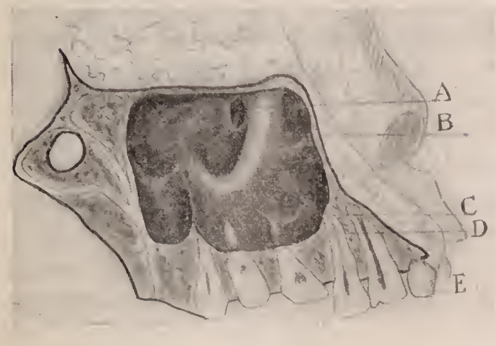

Fig. 5b

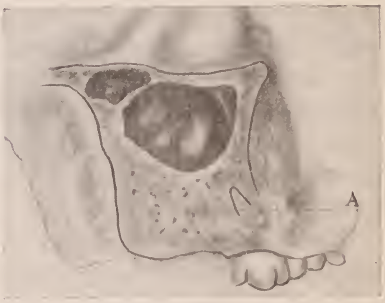

Fig. 5d

Fig. 5—Variations in Antra. 5 a (a) Bicuspid Root; (b) Tooth Root Projection (c) Third Molar. 5 b (a) Ostium; (b) Ridge caused by Lachrymal Duct; (c) Partial Partition; (d) Projuction caused by Root of Second Molar; (e) Cuspid Tooth. 5 c (a) Partial Partition; 5 d (a) Thick Floor of Antrum.

dividing the antrum into two cavities. The mucous membrane of the sinus is composed of ciliated columnar epithelium similar to that found in the respiratory portion of the nose. The subepithelial layer contains the blood-vessels and glands and is so intimately connected with the periosteum that it is difficult to distinguish the line of demarcation. Most of the blood supply of the antrum is supplied by the vessels going through the normal ostium.

It is generally conceded that the antrum is more frequently diseased than any of the other accessory nasal sinuses, due to the fact that in addition to the common causes of sinus disease, we have an important additional etiological factor, namely; the intimate approximation of the roots of the teeth to the floor. Skillern gives the following classification of etiological factors of diseases of the antrum: *First,* "Idiopathic (arising in the sinus itself). *Second,* direct extension from the nasal mucosa. *Third,* infectious deseases. *Fourth,* from alveolus. *Fifth,* through contamination from overlying sinuses. *Sixth,* foreign bodies. *Seventh,* traumatism, direct or indirect. *Eighth* osteomyelitis, tuberculosis, syphilis and malignant tumors. *Ninth,* chronic or latent empyema." The idiopathic factor *i. e.,* direct invasion by bacteria of the sinus without other causes, is rare. The direct extension of inflammation from the nasal mucosa into the sinuses is probably the most frequent cause of sinus infection. With every severe cold or coryza, where the nasal mucosa is generally infected, it is more than probable that the inflammation extends through the ostia of the antra and involves their lining membranes. Thus repeated coryzas may cause such changes in the mucous membrane that the sinus will be more readily infected and tend to chronicity. This tendency will also become evident if there is interference with normal drainage or aeration. It is a common observation that sinusitis follows such infectious diseases as influenza, scarlet fever, cerebrospinal-meningitis, measles and typhoid fever. The rhinologists will remember the numerous cases following our recent epidemics of Spanish influenza, and even now cases of untreated sinusitis present themselves dating their symptoms from the pandemic of the fall of 1918.

There is some variation in the relative frequency of the invading micro-organism in sinus infections. The normal sinus is comparatively free from bacteria since the mucosa tends to expel them or render them inert. In chronic cases pure cultures of one organism is rarely found, usually three to five are present. The staphylococcus and streptococcus are most common. According to Hajek, the relative frequency is as follows: *First,* influenza bacillus, *second,* diplococcus pneumonia, *third,* staphlycoccus pyogenes,aureus and albus, *fourth,* streptococcus pyogenes, *fifth,* bacterium coli, *sixth,* pseudo-diphtheria bacillus, *seventh,* bac. pyocyaneous, *eighth,* bac. Friedlander, *ninth,* meningococcus intra cellularis.

Dental infection was formerly supposed by some observers to be the sole cause of antral empyema. Now with refinements in diagnosis the dental source is considered very much less. Among authorities there is a striking variation in the percentage of dental infection, some placing it as low as 8%, (Hajek), others considering it about 50%. This variation probably does occur in certain practices and clinics. Thus in a dental practice where your attention is centered on dental infections, your diagnosed antral cases, due to this cause, would no doubt be much greater than antrum infections diagnosed by the rhinologists. We believe the concensus of opinion among rhinologists is that antral infections due to dental causes range from 20 to 30%. Skillern presents the following classifications of the methods of infection from the alveolus: (a) by direct continuity from carious teeth; (b) through periostitis; (c) through the circulatory system; (d) circumscribed or diffuse ostitis of the alveolar process, and (e) rupture of an infected dentigerous cyst. In direct continuity from a carious or dead tooth we have the ordinary symptoms of an apical abscess which instead of pointing into the buccal cavity ruptures into the antrum with a usually prompt amelioration of the acute symptoms. Thus we would expect a greater incidence of antral infection from this cause when the root apex is in close proximity to the floor of the antrum. Again an inflammation at the root apex may stimulate the osteogenetic process so as to build a barrier of bone between the antrum and the infected area, or the inflammatory sac about the abscess may serve the same purpose. The antral mucous membrane often is strikingly resistant to infection in its immediate vicinity, therefore a dentist should exercise caution in passing a probe through apex of an infected tooth which may communicate with the antrum, lest he open a direct avenue of infection to the antrum. Although the roots of the second bicuspid and first molar are usually in more direct proximity to the antrum, yet the writer had one case of antral infection where a probe passed through the root canal of an upper left lateral incisor into the antrum, and I believe most of us have seen cases where one could pass a probe into this sinus through the socket of an extracted third molar. Another case of interest was where the infected antrum discharged between the gum margin and neck on distal side of an apparently sound third molar. A periostitis of the alveolar process, resulting from tooth extraction or alveolar abscess or other causes may spread to the antrum. In a circumscribed or diffuse ostitis of the alveolar process there is a "purulent inflammation of the alveolus," the secretion of which is distressing to the patient because of its "exquisitely fetid odor (Skillern)". "In these cases even after extraction of the tooth in the diseased area, there is usually no direct communication with the sinus." The course the infection takes is not clear. Hajek believes it passes through the canaliculi in the bone, others through lymph channels or "along spaces for vessels and nerves." In some cases the microscope shows healthy bone between the infected root of the tooth and the sinus. The theory in antral infections of this type is advanced that the invading bacteria pass through the circulation since there is an intimate anastomosis of the dental and antral veins. Rarely an infected dentigerous cyst may rupture into the antrum. Supernumerary or inverted teeth may irritate the antral mucosa so that it is more readily infected. We must also not lose sight of the fact that because of the proximity of the dental blood supply to the antral mucosa an infected antrum may cause dental infections. An occasional case of empyema of the antrum is the introduction of some foreign body. Thus vomited material, parasites, worms or snuff may pass through the normal ostium and cause trouble. The walls may be perforated through accident, one rather common accident being the forcing of a tooth or root through a thin floor of the antrum. The writer vividly recalls, when a dental student, an incident of this kind. Our instructor had cautioned us, that in the extraction of fragile roots, we should be sure and force the forceps up so as to grasp the more solid portion of the root. A patient having this sort of an extraction problem was seated before us and our instructor delegated our star foot-ball player to perform for us. He was a man of powerful physique and followed his instructions to the letter and went even further than that. To our consternation the tooth and a goodly share of the forceps disappeared in the patient's head. Apropos of this topic an interesting incident occurred in the practice of Dr. W. E. Sauer of this city. A patient had suffered from an empyema of the antrum for years and had previously been operated on but without success. A window was made in the inferior meatus and on irrigation one morning we washed out the root of a tooth. She gave a history of difficult tooth extraction some years previously. No doubt most of us have extracted the floor of the antrum with the tooth. In some cases the frontal or anterior ethmoid cells may drain via the hiatus semilunaris, and normal opening of the antrum, into the maxillary sinus and cause an empyema of the latter cavity. To the rhinologist this sometimes is a nice point of differential diagnosis. It is quite evident the treatment then should not be directed so much to the maxillary sinus as to the other sinuses primarily infecting it.

Other sources of antral infection may be osteomyelitis in early life, necrosis of antral wall in syphilis, rarely tuberculosis and the breaking down of malignant tumors such as sarcomas and epitheliomas. In these latter cases the discharge may be mixed with blood and "broken down portions of the tumor" and have a "peculiar intensive odor."

The mucosa of the antrum is more prone to pathological changes than are the other sinuses, probably because of the unfavorable position of the ostium for drainage purposes. The vent is placed at the upper portion so that the lower part of the empyemic antrum is constantly bathed in irritating pus.

You will recall that the normal mucosa is made up of ciliated epithelium placed over a subepithelial layer containing blood vessels and groups of glands. The periosteum is intimately associated with the subepithelial layer. The entire thickness is considerably less than 1m.m. It is striking to what an extent this thin membrane will thicken while inflamed and irritated. When first infected it becomes hyperemic and there is "an outpouring of serum into the submucous layer which may cause such swelling as to occlude the ostium of the sinus." This swelling paralyzes the cilia more or less and causes an œdema due to the pressure on the vessels. Later there is an osmosis of serum and mucus from the glands, through the epithelium, and is mixed with leucocytes and exfoliated epithelium. Thus we have a pent up secretion within the sinus which is retained because of the occlusion of the normal lumen and the inability of the functionless cilia to sweep it out. In this stage the mucous membrane is œdematous, the intracellular spaces are filled with serum, the blood-vessels are engorged. There may be punctiform hemorrhages, and some round-cell infiltration but no gland changes. If the irritation continues there may be petechial hemorrhages and more round-cell infiltration penetrating the deeper layers to the bone with ulcerative tendency. Desquamation may be present and an overgrowth of connective tissue may ensue with consequent thickening of the mucosa.

There is an impoverished blood supply due to "obliteration of the finer arterioles and veinlets" and the glands are in part destroyed. The ciliated epithelium may become "metamorphosed into squamous epithelium." In chronic cases the mucous membrane may be strikingly thickened due to œdema, of a greyish color, often wrinkled and loose over the bone. A polypoid and papillomatous condition may ensue with retention cysts due to construction of the glands from connective tissue overgrowth. This is called the hyperplastic type. We occasionally find large polyps originating by a small pedicle from the antrum, escaping through the normal lumen or accessory ostia into the nasal cavity and there enlarging so as to almost completely fill it (especially posteriorly) and emerging through posterior choana into the nasopharynx. The secretion may be serous, sero-sanguinous, mucoid, muco-purulent or purulent. In acute cases it usually mixes with the water used in washing out the sinus; in chronic cases it is more likely to float "*en masse.*" This is not a hard or fast rule however. In acute cases of dental origin it is apt to be markedly malodorous and contain caseous masses, yet the same condition occurs due to stagnation with putrefaction.

The symptoms in acute cases frequently follow colds and infections. There is a feeling of distention and pressure due to swelling and hyperemia of the sinus mucosa. The nose on the infected side is more or less obstructed with perhaps an impairment of the sense of smell. The anterior wall may be sensitive, the pain, usually of a neuralgic type, more often is supra-orbital rather than over the body of the maxilla. Occasionally there is a soreness of the upper teeth in relation to the floor of the antrum. The headache, whatever its character, is intensified by stopping, sudden jarring of the head, coughing, sneezing or exertion. Alcohol or tobacco may increase the discomfort. A diagnostic symptom is pus appearing beneath the middle turbinate. If of dental origin the pus may be more copious and of a fœtid character. There may be marked general disturbances as fever and chills, restlessness, gastric and intestinal disturbances due to the ingestion of pus. The patient may have marked malaise and look quite sick. Of course these symptoms vary with the intensity of the infection.

In chronic cases the symptoms show a marked variation. They may be so slight that the patient is unaware of any trouble or they may be so severe as to cause almost intolerable distress. The pain may vary from a slight supra-orbital neuralgia in mild cases, to one involving the corresponding side of the head and even extend to the opposite side. There is not as much of a sense of fullness and distention as in acute cases. In moderate cases the pain may be neuralgic of definite localization, or confined to sharp shooting pains in infra-orbital nerves or more frequently in the supra-orbital region. There may be a dull indefinite feeling of tenderness over the diseased side. These symptoms tend to be more aggravated late in the morning and ameliorate towards evening. This is probably due to better drainage of the sinus later in the day. The nose on the infected side is intermittently occluded, becoming more free when the sinus drains. In severe cases the above symptoms mentioned are more aggravated and the pain becomes almost intolerable. The discharge of the secretion varies with the intensity of the infection and may be apparent only in the morning, or the patient may complain of only post-nasal secretion and crust formation in nasopharynx which is only gotten rid of by considerable hawking and spitting in the morning. The various pathological conditions in the nose as hypertrophies, hyperplasias and polypoid formations determine to a great extent the course of the escape of the secretion as well as its periodicity of appearance. These patients are very prone to have a dry feeling in the throat, lateral pharyngitis, chronic naso-pharyngitis and laryngeal disturbances. There may be a total or partial loss of smell or a subjective sense of foul or fetid odors. We have observed that some chronic cases may resemble the symptoms of hay fever excepting that they have not the seasonal periodicity. That is they complain of paroxysms of sneezing in the morning or perhaps towards evening, with marked watery nasal discharge. One of our patients, a stenographer, was obliged to lay a towel on her desk while working, to catch the watery nasal secretion as it dripped from her nose. Excessive lacrimation may be annoying. Some may have asthmatic symptoms and the general condition may be very much run down with loss of weight. A chronic or harrasing cough may persist to such an extent that patient thinks he has tuberculosis; again these patients may present the well known train of diseases as rheumatism, endocarditis, general malaise, neuritis, certain eye affections or other pathological processes which may supervene as sequelæ of focal infection. Our diagnosis is determined by a study of the history and symptoms, and in addition by various adjuncts at our disposal such as needle puncture of antrum with lavage, X-ray, transillumination, and suction or negative pressure. Of these by far the most valuable is the needle puncture. This is a simple procedure and quickly performed. The inferior meatus in the region of the maxillary process of the inferior turbinate is cocainized with 20% cocain, and a Mikulicz needle carefully pushed through the bone of this area which is usually thin. (*Fig. 6*). Care is taken that the needle point is free within the antrum before forcing first the air and then warm normal saline solution. If pus is returned with the wash water that is evidence of pus within the antrum. The next step is to determine whether the antrum is itself the source of this secretion, or whether it acts as a reservoir for the overlying sinuses; *i. e.*, the frontal or anterior ethmoids.

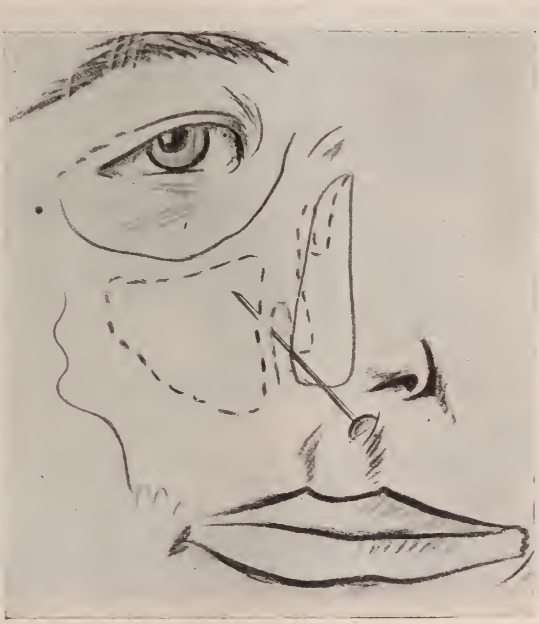

Fig. 6—Needle Puncture of Antrum. (After Skillern)

In our diagnosis we must consider whether an infected tooth or root is the etiological factor. Since 20 to 30% of antral infections originate from this source, a careful investigation of the mouth is essential.

Transillumination of the maxillary sinus is easily accomplished but unfortunately unreliable, due to the various shapes and thicknesses of the antral walls on either side. To perform this, the room is darkened or a photographer's hood is used. Light is passed through the middle of the roof of mouth into the nasal chambers and floor of antra. If both sides are normal, both bodies of the superior maxilla will be equally illuminated, a crescent of light showing in lower eyelid and a slight pupillary reflex will appear. (*Fig. 7*). The patient also has a subjective sense of light in the eyes. If the mucosa of the antrum is thickened there will be an obstruction to the light rays with a consequent shadow over the affected side. Pus and secretion apparently do not interfere much with the light rays.

The X-ray is of greater value but also in a degree subject to the same objections as transillumination. Personally we will say, however, that we frequently are impressed by the X-ray as being a very valuable adjunct in diagnosis. (*Fig. 8*). We have at our disposal various devices designed to produce negative pressure in the nose, thereby endeavoring to suck the secretion from the various sinuses and aiding us in determining the source of the pus. It is not always a successful procedure and there may be some question as to whether or not the accumulated secretion is not drawn from the various recesses within the nose.

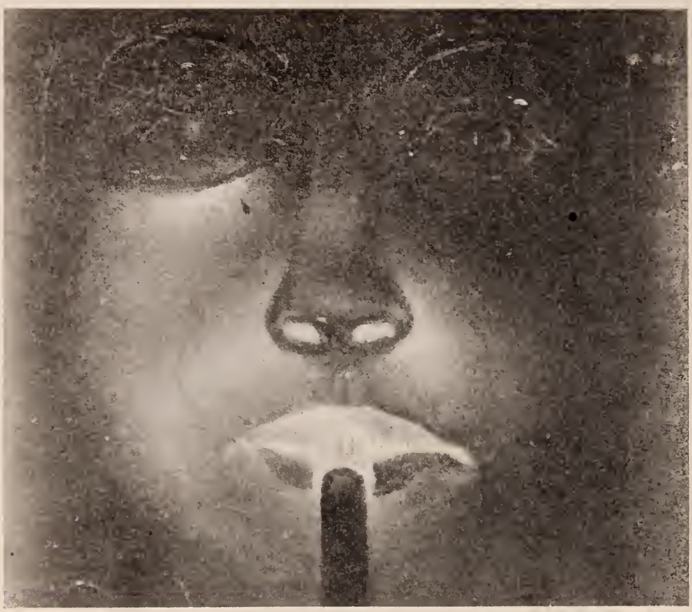

Fig. 7—Transillumination of the Antra. Right, healthy; Left, diseased. (After Coakley)

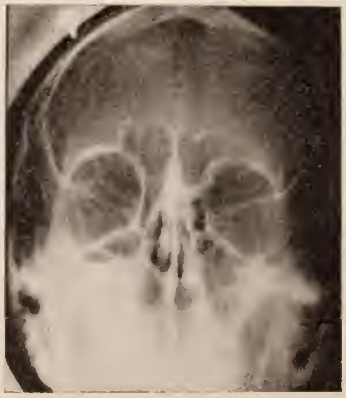

Fig. 8—X-ray of Antra. Right Antrum diseased.

In brief the diagnosis usually is established by needle puncture, history, symptoms and X-ray.

The treatment depends on the degree of the pathological changes present. It is rather striking the number of cases that respond favorably to conservative measures such as the establishment of drainage via the natural ostium, and irrigation of the sinus by means of the needle puncture beneath the inferior turbinate. In acute cases, and where extensive pathological changes have not been established, a few irrigations with normal saline solution and the judicious shrinkage of the nasal tissues, to permit drainage from the normal antral opening, usually suffice to clear up the condition. If, however, an alveolar abscess or other infection of dental origin is the etiological factor, it is self-evident that this cause will have to be eliminated. In these cases it was quite the vogue, as in the Cooper operation, to extract the offending tooth and enlarge the alveolar socket into the antrum so as to permit irrigation. This method is effective providing the necrotic bone and diseased tissue is removed, but if prolonged drainage is necessary, or if there are extensive pathological changes within the antrum, more radical measures are required. As a sequel of the Cooper operation, we occasionally are confronted by a stubborn fistula discharging the foul and nauseating secretions of an empyemic antrum into the mouth for years. This condition is distressing to the patient and, at times, the surgeon experiences considerable difficulty in closing the fistula.

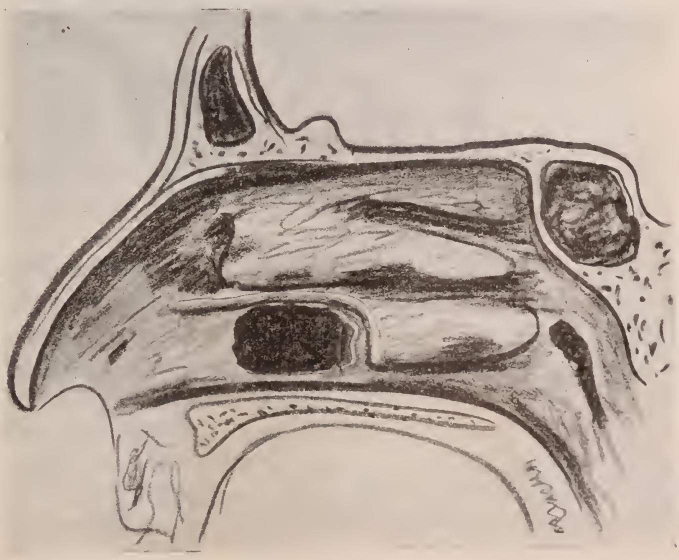

Fig. 9—Mikulicz or Window Operation. (In order to show the window, more of inferior Turbinate is removed than is done in the operation).

Where prolonged drainage is necessary, the removal of a section of the naso-antral wall in the inferior meatus has proven very successful This is known as the Mikulicz operation (*Fig. 9*), of which there are a number of modifications especially as to conservation of the inferior turbinate and the use of a mucous membrane flap extending from the floor of the nose into the floor of the antrum. The diseased antral mucous membrane, when relieved of the irritating secretions, shows a marked tendency to regenerate and return to a healthy condition but if necrotic bone, extensive polypoid degenerations or considerable granulation tissue are present within the antrum, one must resort to some method whereby an inspection can be made of the antral walls and thus more thoroughly and accurately attack and remove the diseased portions. With this object in view, a portion of the anterior antral wall is removed as in the Kuster operation. When this is combined with the Mikulicz procedure, it is known as the Caldwell-Luc operation. (*Fig. 10*). Some failures resulted because of difficulty of access to the angle of the pyriform fossa and the anterior antral wall, so Denker further modified this operation by removing this angle. (*Fig. 10*). A number of excellent modifications of these methods are used by various operators.

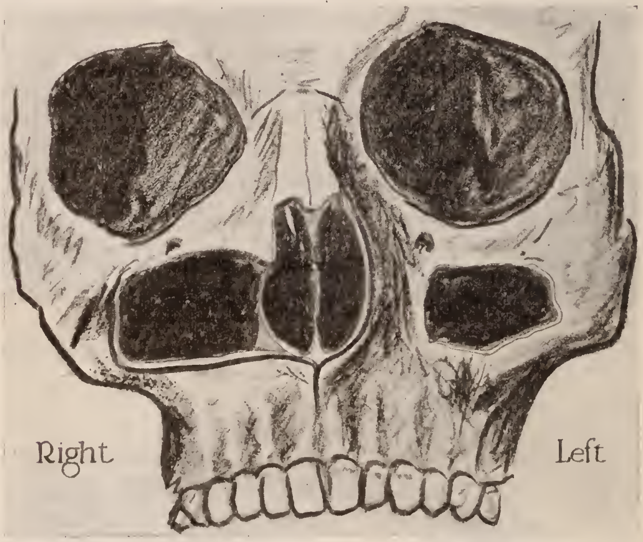

Fig. 10—Denker Operation, Right. Caldwell-Luc Operation, Left.

University Club Bldg.

REFERENCES

[1] Skillern, "Accessory Sinuses of the Nose."
[2] Blair, "Surgery and Disease of the Mouth and Jaws."
[3] Brown, "Oral Diseases and Malformations."

CARE OF THE GINGIVA IN PREVENTIVE DENTISTRY.*

BY H. E. FRIESELL, B.S., D.D.S., LL.D., PITTSBURGH, PA.

THE MOST SERIOUS ASPECT of oral disease as it is considered today is the development in the mouth of infectious foci whose vitiating influence is manifested through serious lesions in distant and vital organs and tissues. These infections can be traced largely to two principal avenues of entrance to the vascular and lymphatic systems. These avenues are the pulp canals and the gingival border of the peridental membranes. Exposure of the pulp canals is caused by a disease called dental caries. A lesion of the free margin of the gum, of the gingiva is the practically universal precursor of disease beginning at the gingival border of the peridental membrane.

If dental caries can be prevented or controlled before pulps are exposed and abscesses developed; and if the investing tissues of the teeth—the gingiva and peridental membranes—can be maintained in good health, the two main avenues of systemic infection through the mouth will have been closed. If oral foci of infection can be prevented, one of the principal sources of systemic disorders will have been eliminated, and dentistry will have taken what a famous surgeon has called "the next great step in preventive medicine."

The second and most frequent portal of entry of infection into the blood stream through the mouth is undoubtedly through the gingival border of the peridental membrane, and inasmuch as the usefulness and preservation of the tooth also depend upon the maintenance of a healthy peridental membrane, the prevention of disease in this organ assumes paramount importance.

Nature makes provision for this protection by means of a special arrangement of the gum tissues to a portion of which we give the term gingiva, or gingivæ. Dental literature affords an interesting study in the development of dental nomenclature. The terms applied to regions, or to procedures that are more or less obscure, are vague, loosely applied, and frequently confused as to meaning. As the importance of a region or procedure becomes more apparent, the need arises for a more definite application of specific terms, and exactness and clarity succeed looseness and confusion.

It is only quite recently that the significance of the gingival region and tissues has become apparent and thus emphasized the need of a more definite nomenclature of the parts. This can be clearly demonstrated in a casual inspection of our journals and text-books. For instance, much confusion still exists in the application of the terms gingival margin, gum margin, gingival line, gum line, etc.

The old definition of the gingiva which was used generally until eight years ago, was "that portion of the gum tissue enveloping the necks of the teeth crownwise from the attachment at the gingival line—

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*(Read before the Indiana State Dental Society, May, 1921.

the free margin of the gum." The terms "gingival line," and "neck of the tooth" were vaguely interpreted by most writers.

The latest definition is that the gingiva is all of the gum tissue which lies to the occlusal of the crest of the alveolar process. It is divided into body of the gingiva, free gingiva, and septal gingiva. Its occlusal extremity is known as the gum line (not the gingival line.)

The body of the gingiva is that part which is attached to the peridental membrane enveloping the neck of the tooth, and to the crest of the alveolar process.

The free gingiva is that portion of the gingiva which lies to the occlusal of the gingival line on the labial, buccal and lingual surfaces.

The septal gingiva is that portion of the gingiva in the interproximal space which lies to the occlusal of the gingival line.

The gum margin, or free gum margin, includes the free gingiva and septal gingiva.

The gingival line is the apical extremity of the enamel.

The gingival margin is that area of the axial surfaces of the crowns of the teeth that is normally covered by the gum margin.

The sub-gingival space is the space extending from the gum line to the gingival line, and lying between the free gum margin, and the gingival margin.

The gingiva covers the occlusal border of the process, the neck of the tooth, fills the septal space, and overlaps the gingival area of the crown of the tooth in such manner as to protect from decay much of the enamel surface that is not kept scoured and polished by the food during mastication.

The gingiva, like the gum tissue proper, is composed largely of dense masses of fibrous tissue, and well supplied with capillaries. The body of the gingiva is attached tightly to the alveolar process and necks of the teeth by these fibers. Transseptal fibers extend from the proximal portion of the neck of one tooth to the approximating one, and hold the teeth firmly together and tightly in contact. Other fibers extend from the body of the gingiva into the free gingiva and septal gingiva, and cause these latter to hug the gingival margins of the enamel tightly, thus excluding food and debris from the sub-gingival space.

The gingiva protects the peridental membrane from exposure to the secretions of the mouth and from injury, and it also prevents caries from beginning on the gingival margin of enamel so long as the gingiva is healthy and in its normal position.

The peridental membrane once exposed to the secretions of the mouth and direct access by the bacteria thereof, readily becomes infected, a condition which is practically hopeless of cure, and extremely difficult of control.

The gingiva possesses most remarkable powers of recuperation and of resisting infection. So long as the gingiva remains in a normal, healthy state it affords perfect protection to the peridental membranes against infection or disease beginning at the gingival border, and since that point is the most vulnerable and most frequent focus of infection in the mouth, it becomes our first duty to maintain the gingiva in sound health.

While the gingiva is so highly resistant to injury and infection, it also should be recognized that it is subjected to unusual exposure to injury in mastication, owing to its position in the mouth.

Under normal conditions the form of the crown of the tooth, as a result of its various contours, and especially the height of contour on the axial surfaces, is such that during mastication the food passes from the tooth surface and strikes the gingiva at a tangent, passing over its surface and affording it normal use and stimulation. But if there be any deviation from the desirable contour of the tooth, whether it be due to wear, decay, unskilled restoration or other cause, which results in directing the food against the gingiva in such manner as to produce repeated injury, inflammation and infection must eventually result, notwithstanding the remarkable vitality and resisting powers of this tissue. So close is the connection between the gingiva and the peridental membrane that serious injury to the former ultimately results in disease of the latter tissue with the pathological sequelæ familiar to all.

Interference of any kind with the attachment of the gingiva to the peridental membrane at the gingival line results in a relaxation of the fibers that hold the gingiva snugly against the gingival margin of enamel; enlarges the sub-gingival space; permits the collection and disintegration of food in the space with consequent infection of gingiva and peridental membrane; and through tumefaction and hypertrophy causes an extension of the gingiva beyond the contour lines of that tissue, which normally harmonize with those of the tooth crown, and in this way also makes possible impingement of the food upon the gingiva with the results already stated.

Since physical injury of the gingiva precedes infection and disease thereof in practically all cases, let us consider some of the most common causes thereof; namely:—

Lack of contact of proximal fillings.
Broad flat contact of proximal fillings.
Worn contacts of teeth, and of fillings,
Weak contacts,
Poorly-contoured crowns,
Faulty position of contact points,
Failure to restore height of contour,
Failure to restore marginal ridges,
The curvature of the gingival line on various teeth,
Improper application of ligatures and rubber dam,
Improper use of scalers and separators, and
Extension of cavities to gingival line.

A more careful study of tooth form with special reference to the gingival line and the height of contour, as well as the contact point, the form and position of the gingiva, and a recognition of the importance of a harmonious inter-relationship between the contour lines of tooth surface and gingiva, will accomplish great good in preventive dentistry and the control of oral focal infection.

Let us make a brief review of tooth form in general. Lying upon the body of the mandible and maxillary bones we have a lighter framework or scaffolding of bone, called the alveolar process which surrounds and supports the greater portion of the roots of the teeth; the tooth roots being located in cavities in the process called alveoli. The alveoli do not surround the whole of the cementum-covered portions of the teeth but enclose them only to a point about two to four millimeters from the cemento-enamel junction.

In naming the divisions of a tooth it seems appropriate to the essayist that they should be termed the crown, neck and root (or roots as the case may be). He would define the crown, as the enamel-covered portion of the tooth; the root as that portion of the tooth normally enclosed in the socket or alveolus; and the neck, as that portion of the tooth lying between the crown and the root, which is covered by cementum but is not enclosed by the socket.

In general form the crowns of the anterior teeth, the incisors and cuspids, are shaped like a wedge with rounded angles. The proximal surfaces are convex in both directions in the incisal half; and flat or slightly concave in the gingival portion.

The posterior teeth, the bicuspids and molars are cuboidal in form with rounded edges.

The proximal surfaces of the bicuspids and molars are convex bucco-lingually and concavo-convex occluso-gingivally. Sometimes in the gingival third they are also concave bucco-lingually.

THE HEIGHT OF CONTOUR

The gingival extremity of the enamel, or the junction of the enamel and cementum, is called the gingival line. If we pass from any point on the periphery of the occlusal surface to the gingival line in a direction parallel to the long axis of the tooth, we will establish a line which will be either convex in its entirety, or convex in the occlusal portion and concave as we approach the gingival line. The points of greatest convexity on lines of this type drawn at various portions of the surface will not be on the same horizontal plane, or equi-distant from the plane of the occlusal surface, but will vary in accordance with the general form of a particular tooth. If many of these lines be made on the axial surfaces of the tooth, running from occlusal surface to gingival line, the point of greatest convexity on each line marked, and these points connected with each other by a line circumscribing the tooth horizontally, that connecting line would indicate the *height of contour*. Or, if a tooth were placed upright upon a plane surface and numerous square edges were placed against it, the edge of each instrument would be a vertical line and would touch an axial surface of the tooth at a tangent. A line drawn through the points of contact of square edges with tooth surface would be the *line of vertical tangents*, or as the essayist prefers to term it, the *height of contour*. If a tooth crown were viewed from the occlusal its lateral outline would be established by the height of contour; and the crest of the height of contour on the proximal surfaces would be indicated by the points of proximal contact.

IMPORTANCE OF THE HEIGHT OF CONTOUR

The height of contour marks the division between the clean and the unclean surfaces of the tooth. All tooth surface (occlusal and axial), which lies to the occlusal of the height of contour is scoured by the food in mastication and is, therefore, a clean surface, upon which no extension for prevention is required. All tooth surface between the height of contour and the gum line is an unscoured, or unclean surface. Cavities of decay beginning upon such unclean areas will spread widely over the surface and extension of the cavity outlines will be required in order to prevent recurrence of decay around the margins of the filling.

The general form of the height of contour as it passes around the tooth, and is viewed from the occlusal, is concave on buccal and lingual surfaces, and convex on the mesial and distal. It approaches fairly close to the gum line on the buccal and lingual surfaces; and on the proximal surfaces it inclines toward the occlusal, coming nearest to the latter surfaces at the contact points. The gum line very largely parallels the height of contour around the tooth, the two lines approaching each other very closely on the proximal surfaces, and separating more upon the buccal and lingual. Any pronounced variation from the normal in the form of a tooth surface will cause a considerable variation in the position of the height of contour.

To show how the height of contour may vary upon a tooth surface in accord with a departure from the ordinary form of that surface a small marking device called a contouragraph has been made. The tooth is mounted horizontally between two holders which will establish its long axis in relation to the direction of force as applied in mastication; superimposed, and parallel thereto, is mounted another roller covered with a marking material. When the tooth is rotated against the marking roller, the highest points of each surface come consecutively in contact with it and indicate the height of contour by a line that is made by the colored roller.

Much stress has been laid upon the importance of the contact point, and it would be difficult to overestimate its importance; but the contact point is only a part of the height of contour, which latter has received entirely too scant attention in both dental literature and practice.

THE CONTACT POINT

On account of the form of the proximal surfaces previously described, the teeth present convex surfaces at their widest mesio-distal diameters where they come in proximal contact, and as the proximal surface slopes away in all directions (occlusal, gingival, buccal and lingual), from this place of contact we have a form of proximal contact, as Black has described it, "such as would be made by the contact of two marbles, or at a single small point." The form of the proximal contact then, is a point such as one would find between two convex surfaces in touch with each other.

The surface of the tooth immediately around the contact point will be convex but seldom uniformly so in all directions. It may appear spherical in one aspect and elliptical or ovoid in others; but in any case the actual contact should be a point of contact not a line or surface of contact.

It should be remembered that the essayist is referring to the ideal, the desirable, the best form of contact—the type that we find most frequent among the best preserved dentures.

POSITION OF THE CONTACT POINT

The position of the contact point is equally as important as its form. It will not do to build up a convexity at any part of a proximal surface and because it necessarily comes first in touch with the approximating tooth, conclude that we have made a satisfactory contact point. The position of the contact point depends to a very great extent upon the form of the tooth, the form of each surface, its height of contour, the mesial and distal marginal ridges and the position of the tooth in the arch. To know where to place a contact point demands an intimate knowledge of tooth form. The best way to obtain that knowledge is by a careful study of Black's Dental Anatomy (the most important work in dental literature), in conjunction with the study of extracted teeth, prepared skulls, and finally the teeth of each patient.

In the best form of denture, composed of bell-crowned teeth, the contact points will be found to be in line with the cutting edges of the incisors and cuspids, and slightly to the lingual of the tips of the buccal cusps of the bicuspids and molars. However, in thick-necked teeth, and those of a more rounded contour, the contacts may be placed slightly more to the lingual. In some dentures where the second and third molars are small and more rounded than usual their contacts may be located midway bucco-lingually.

In the best formed arches the contact points are near the occlusal surfaces, and only so far away from them as will result from the form and sloping of the marginal ridges. If the contact points be placed too close to the occlusal surface there will be a decrease in the amount of food that sweeps through the embrasures and a consequent lessening of the scouring or polishing of the exposed proximal enamel, with the result that caries will have a greater opportunity to attack those surfaces. If the contact be made too close to the gingival margin as will be the case if the marginal ridge is not reproduced, the tendency will be for food to wedge the teeth apart allowing it to strike upon the septal gingiva, something which must *never* be permitted. The septal gingiva fills the septal space in the form of an arch, with its convexity towards the occlusal, and the contact point should be placed where it will be just over the crest of the arch of the septal gingiva.

MARGINAL RIDGES

The mesial and distal marginal ridges are strong ridges of enamel, which form the mesial and distal boundaries of the occlusal surfaces of bicuspids and molars, and the angle of junction of the occlusal surface with the mesial and distal surfaces. These ridges are crossed by a faint groove, or fine line, indicating the line of junction with the lingual lobe of the tooth. They are rounded slightly towards the proximal surfaces, merging into the proximal convexity that extends to the height of contour.

THE INTERPROXIMAL SPACE

The teeth are considerably broader mesio-distally between their contact points than they are at the gingival line. This results in considerable spaces between them called interproximal spaces. The interproximal space extends from the crest of the alveolar process to the occlusal angles of the teeth, and is bounded bucco-lingually by the buccal and lingual planes of the teeth. It is subdivided into the buccal and lingual embrasures and the septal space. The septal space is normally filled by the septal gingiva. The width and form of the interproximal space are very important, because if the space is lessened by a dropping together of the teeth, as a result of proximal decay, or by an improper contouring of the proximal restoration, the health of the gingiva will be imperiled, thus inviting further proximal decay and peridental injury.

The restoration of the proper form of the interproximal space is just as important as the restoration of the proper form of any tooth surface. A surface contact, or a line contact bucco-lingually, will necessarily render the buccal and lingual embrasures more narrow and limit the amount of food passing through them with the results previously mentioned. Between the anterior teeth, on account of their arrangement in an arch, the labial embrasures are larger than the lingual, while between the posterior teeth the lingual embrasures are wider than the buccal due to the lesser size of the lingual lobes of the teeth.

SUMMARY

In order to practice preventive dentistry in accordance with the best information we have on the subject at the present time it is necessary for the dental profession to advocate and observe the following:

First, early instruction in mouth hygiene for the purpose of limiting such types of decay as may be checked or prevented, by brushing the teeth and cleaning the soft tissues, and in order to impress the young patient with the need of such attention to the mouth, as well as to accustom him to the feeling of a clean, healthy mouth.

Second, to make frequent and careful investigation of the areas of attack of the various stages of caries, and especially to discover and properly treat pit and fissure cavities and so far as possible to prevent the development of proximal and gingival third decay.

Third, to study the form, position, contour and condition of the gingiva and the inter-relation of the form and contour lines of the hard tissues with those of the gingiva.

Fourth, to recognize immediately the slightest departure from the normal in the form or condition of the gingiva and promptly to remove the cause thereof.

Fifth, to appreciate the importance of the gingival tissues; to make them the subject of careful study and observation; and to recognize that it is just as important that tooth restorations be made to harmonize with the form and contour of the gingival tissues as it is to secure proper contour and adaptation to the cavity walls and surfaces.

Sixth, to perform all operations in the mouth in accordance with the best knowledge we have of the mechanical and pathological factors involved.

Seventh, to recognize that preventive dentistry means much more than the occasional cleaning of the teeth by the dentist or hygienist; that the protection of the hard and soft tissues of the mouth requires the highest type of skill and knowledge possessed by the dentist; that attention to the mouth must begin early, be continued regularly and be carried out thoroughly and intelligently, if success in prevention is to be obtained.

When we dentists realize that to concentrate our attention on the care of the teeth of the children, and to carry them through to maturity and middle age with healthy mouths and no pulp exposures or gingival lesions is a thousand times more important to the human race than for us to establish a reputation for the highest skill in mechanical procedures; when we recognize that the prevention of dental disease and the maintenance of health as a result thereof is vastly more ennobling than the establishing of an enviable income through high-priced adult dentistry, to the neglect of the care of the children, the *Soul of dentistry* will have awakened and our profession will receive, and will merit, the respect and the esteem of mankind.

Highland Building

QUESTIONS AND ANSWERS

A MEMBER: Do you think it advisable to use ligatures in using a rubber dam?

DR. FRIESELL: I see no reason why a ligature should not be used where that ligature is necessary for the safety or surety of the operation, or the convenience of the operator, provided the operator knows how to apply the ligature without causing injury to the tissues. If he is familiar with the position of the gingival line on the given teeth, if he understands the *height of contour* and where the ligature should be placed in order to hold the rubber dam in position, and if he places the ligature in such a way that he does not draw it straight across bucco-lingually so that it will pass the crest of the gingival curvature and not impinge upon the peridental membrane at that point, there is no reason why he cannot apply it without causing injury to the tissues. There are many cases in which the rubber dam can be applied without the use of a ligature, but where it is required, it must be used in such a way that it will not cause injury. When you see a patient wince when you are using the ligature, you can be sure that you are doing something with that ligature that you should not do. I never fully appreciated this until I had a ligature placed around one of my own teeth by a very vigorous operator, and after that I had some sympathy for the patient. One can draw a ligature straight across from labial to lingual or buccal to lingual in such a way that he draws the ligature right down into the peridental membrane and can cut it and injure it just as certainly as if he did it with a knife.

A MEMBER: What effect has the wooden toothpick on the gingivæ? People jab around with wooden toothpicks until they get a hemorrhage.

DR. FRIESELL: I think the wooden toothpick is an accomplice after the fact in most cases. There is usually a condition of the interproximal space which makes it possible for food to collect there and then we use the toothpick to get rid of it, If the toothpick were used intelligently by a patient it would probably retard the ultimate destruction of that tissue. I do not see how it could do any particular harm unless it were driven down into the gingival tissue beyond the gingival line; but the condition that makes it necessary indicates a diseased condition in the interproximal space, the cause of which should be ascertained and removed so that the normal condition can be restored, if possible. Of course, where we have a detachment of the peridental membrane at the neck of the tooth and food packs in there it must be taken out, and where you have a patient with that condition you will have to instruct him how to take care of that difficulty.

A MEMBER: What do you think of the general use of a ligature in the practice of prophylaxis by a patient?

DR. FRIESELL: I have been traveling around on sleeping cars a great deal this past winter and I have wondered sometimes if a lot of the people have not taken some of our teachings more seriously than we intend them to. I have seen men scrub their teeth in a way I would not want the bricks on my front pavement scrubbed. You can hear them out in the middle of the car when you are riding on a Pullman, and I imagine they think they are performing some religious obligation. I think the improper use of the ligature may cause injury. He would have to keep it up a long time before he would cause considerable injury, and if the patient, at reasonable intervals sees a dentist who appreciates the importance of these tissues and makes a real study of the patient's mouth, he should be able to discover those conditions and direct the patient in the use of the ligature. I do think that the ligature is recommended for use by the patient many times when it would be better not to use it.

A MEMBER: Do we have a receding of the gum tissue in middle life, just as a natural consequence, say, of a person fifty years old?

DR. FRIESELL: The gum tissue or free gingiva gradually recedes in old age, not in middle age, but when we have passed beyond middle age.

A MEMBER: What is old age?

DR. FRIESELL: There was one time when I thought anybody thirty years of age was very old. I don't think you get to be old now until you are over one hundred. When you reach the age when all the indications of a general physical decline begin to manifest themselves, you are getting old. Of course, baldness is no longer any indication of age. When the individual begins to lose teeth and indicates by the normal changes that he has gone over the crest and is beginning to slide down hill, no matter how slowly, you will find then there is a gradual loosening or recession of the free gingivæ. In the average mouth, long before that takes place, there has been a flattening of the contact surfaces due to the lateral movements of the teeth and such recession as might be due to the gradual shrinkage of those tissues.

A MEMBER: Do you always have a tumefaction after the recession of the tissue?

DR. FRIESELL: Not always, but if the food is forced in there and kept in contact tightly against the tissue, you will likely have it. It begins to get sore, and the patient takes a toothpick and digs out the food.

A MEMBER: Do we always have a recession before we have tumefaction?

DR. FRIESELL: Proximally, I would say generally, unless it is a tumefaction due to some specific injury, an unusual injury, and not due to the conditions we have been explaining.

A MEMBER: Did you describe the technic by which calculus can be removed without injuring the gingivæ?

DR. FRIESELL: It is simply a question of using an instrument and the type of instrumentation that may be necessary to remove the particular kind of calculus that you have in a given case, and knowing the position of your gingival line and your sub-gingival space and adapting real knowledge of the case:—the application of that knowledge, not just having an academic conception of conditions and forgetting all about it when you put the instrument in the patient's mouth. If you take a scaler and start in between the lower incisor teeth and pull it up like that (demonstrating), you get a lot of calculus and usually get a lot of other things off the teeth that had better remain there. But if you remember the position of your gingival line, the curvature of it, the approximate depth of the sub-gingival space, and if you use an instrument by which you can go under the gingiva without causing injury to that tissue, and lift off, or loosen the calculus by a pushing motion and then lift it out by a proper instrument, you should be able to do that without causing injury to the tissue. If you cannot remove it without causing injury to the tissue, you had better leave it there. The main point I am trying to make in this lecture is the fact that the principal sources of many systemic diseases can be traced to oral foci, and that these infections can be controlled if we will simply apply conscientiously and intelligently the fundamental knowledge that each one of us has learned in dentistry. It is not a question of anything that is secret or very difficult. It is simply a question of appreciating the function and the importance of these tissues in this gingival region, and recognizing also the fact that an injury to the hard tissue of the tooth is comparatively simple because it is amenable to ordinary mechanical technic, but that a permanent injury to the gingival tissue is much more serious, and when you see anything in the mouth that gives promise of bringing about an injury of that kind, your duty is to ascertain the cause of that and remove it. Keep the gingival tissue in normal healthy condition, and if you do that you will not have disease of the gingivæ proper, or of the peridental membrane. You will not have pyorrhea, and you will keep closed the principal portal of entry for infection that does in some cases result in serious systemic disease, and which can be controlled by intelligent, conscientious dentistry.

A MEMBER: Do bridges cause a great deal of peridental trouble?

DR. FRIESELL: Any restoration, whether it be a filling, inlay, crown or bridge that causes a chronic irritation of the investing tissues, the gingivæ, is injurious to the patient and should not be permitted to remain in the mouth. This is not an academic question, although most of us have looked at it in that way. It is a question of fact, and, like other facts, it is a stubborn thing and in order to meet it we must face it honestly and remedy the condition. If we cannot put on a crown for a patient in such a way that it does not cause irritation to the investing tissues we had better not put on the crown, because the patient will be better without it. The gingival tissue has remarkable recuperative power. Just so long as it has not become detached from the neck of the tooth at the gingival line, it will reproduce itself. Once it has become detached, then you are in difficulty. Then you have to make the best of a given condition and watch it carefully and try to control it and keep it from becoming worse.

A MEMBER: What do you think of the so-called surgical treatment of pyorrhea?

DR. FRIESELL: What is pyorrhea? It is a chronic infection of the peridental membrane beginning at the gingival border of the peridental membrane. It is due very largely to the detachment of the fibers of the peridental membrane, a detachment of the gingivæ and the formation of a pocket there. Food, micro-organisms and much else gets in there and we have putrefaction or some other degenerative change taking place, with an infection of those tissues. If we can remove that pocket and still have enough supporting tissues in the alveolar process and soft tissues to retain the tooth so that it may be of some use to the patient, we can overcome that infection very largely by obliterating the pocket. If the case required the removal of that overhanging tissue, I would do it if the general conditions justified it, because if you obliterate the pocket the patient can then keep the exposed tooth surface clean if he keeps up a particular hygienic procedure for his case, and in that way can control the development of the disease The patient will have to pay particular attention to cleansing those surfaces. I do not believe you can cure pyorrhea in that way, but you can control it although I would just as leave not be the patient. I think the best way to cure pyorrhea is to catch these patients young and keep the gingivæ in a healthy, normal condition, and then you will not have it.

A MEMBER: What do you think of the Silver treatment for focal infection?

DR. FRIESELL: There are only two ways that amount to anything by which the patient can suffer from what we call rather loosely "focal infection"—one through the root canal and the other through the peridental membrane. Protect the gingiva, keep it in proper condition, and you will not have proximal decay, and the mouth in which the gingivae are kept in good condition will probably not have gingival decay, because it is the least common of the various classes of caries.

If you get your patients early enough to do that, the only other place that is vulnerable is in the pits and fissures of the teeth. You know where they are. You ought to find these cavities before they make any great progress and they should be filled in a way that is suitable for a given case and before there is any possible encroachment upon the pulp. If you do these things you can keep closed both of these avenues of focal infection. This question of focal infection, which the medical profession has become somewhat hysterical about (and a lot of our own men have done the same thing), is not a very serious thing if we can get the patients early enough and simply practice intelligent dentistry upon them.

A MEMBER: Referring to the separation of teeth, what do you think of the method of slow separation without the use of mechanical instruments?

DR. FRIESELL: It depends upon how much separation you want. If it is just a question of the normal amount of separation, you can do it with a ligature and cotton. If you have to get more separation and if you have to keep it up several days, the peridental membrane will become very sore, so that anything you do to the tooth will cause the patient more pain than when the mechanical separator is rightly applied. You can do a great deal of harm with the mechanical separator if you do not understand the application of it. It is a question of considering the tissues you are working on, how much elasticity they have. If you apply the separator in such a way that it takes up that elasticity not too rapidly, it is much easier on the patient if you can use a mechanical separator, and easier for you than the slow method, and you do not have the peridental membrane irritated by having a ligature tied in place for three or four days. Neither does the patient have to come back to the office every day for three or four days to have it replaced.

I want to repeat again that the basis of my message, which I have been preaching for several years now, is that the most important tissue in the mouth for dentists to be familiar with, to study, and to protect, is not the enamel, it is not the dentin and it is not the cavity in the tooth. It is the gingiva.

DR. TINKER'S SYSTEM OF CROWN AND BRIDGE-WORK AND ITS EFFECT UPON THE PATIENT*

BY S. D. TERRELL, D.D.S., RANGER, TEXAS

IN PREPARING THIS PAPER it is my intention to endeavor to demonstrate why members of our profession should be vitally interested in post-graduate work. Our profession, still in its infancy, perhaps, has made wonderful progress in the past few years. It has been my chief desire since entering into the practice of dentistry, eight years ago, to make a real dentist and not one who works from a mercenary motive alone.

A professional man, to make a real success of his life work, must put his whole soul into it. In recent years I have practiced dentistry under all the difficulties anybody has to contend with in a small town. I could do the ordinary work anybody else could do, but that wasn't saying much for me or the other fellow either. In other words I had fallen into a rut, and every day I found it increasingly more difficult to get out.

Most dentists in small towns do not read as much as they should, thereby becoming "rusty" in most subjects except the ordinary routine of every-day practice. Neither do they attend society meetings as they should; thus the importance of post-graduate work to overcome this deficiency and to keep their work up to the standard of the time.

About a year and a half ago I began to read in the different journals on the subject of "One Hundred Per Cent Vitality and the Preservation of Pulps." The more I read the more I became interested in this vital subject, and today I am convinced that these pioneers were and are in a large measure correct when they say, that root canals cannot be filled successfully. This being conceded, then it is up to the profession to find a method of bridge-work construction whereby the vitality of the abutment is not impaired.

Dr. Edward T. Tinker, of Minneapolis, Minn., has worked for years on the subject of bridge abutments upon vital teeth, and he, with other great men in our profession, have given us a most wonderful method of crown and bridge construction.

Dr. Tinker's method of crown and bridge work is a system of full and three-quarter cast-jacket crowns and dummies. It is not my intention to go into details on this subject but it is almost necessary to do so in order to make things clear. I will give you the thought Dr. Tinker gave us in his opening lecture: "The study and application of crown and bridge restoration, both of the fixed and removable type, is one of the most fascinating in our line of endeavor, and I know of no other branch of dental effort that is accomplished with a greater degree of satisfaction to both the patient and operator, than the taking of a badly-mistreated mouth, infested with diseased areas and disfigurement, and restoring the same to health and approximation of its original beauty."

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*Presented at the Annual Convention of The Texas State Dental Society, held at Dallas, March 3-5, 1921.

It is important to have X-rays of the mouth, including all the spaces where the teeth have been lost, to ascertain whether or not processes have been injured by pyorrheal pockets, and if there have been any root tips left to cause infection to appear after our restorations have been made. The radiographs are also useful in determining the extent of caries, especially under old fillings and crowns.

We should make a study model of both arches in order to determine the amount of adjustment that is to be made in the way of opening the bite, etc., and removal of malposed teeth. All this is important because we are dealing with the mouth as a unit, and each tooth being but a part. This will give us a mental picture on which to base our work.

Before starting the work, the mouth should be thoroughly cleansed, eradicating all foci of infection; faulty contacts, and overhanging margins should be corrected.

We must study our occlusal planes in order to make the proper articulation to prevent lameness, or even the loss of the teeth. Dr. Tinker says, "Necessary to a proper occlusion and articulation is correct tooth form, and here lies one of our weak points." We must take into consideration the embrasures for the sake of the gum tissue, which are exaggerated more in dummies than in the natural teeth, to facilitate greater range in cleansing.

I have tried, in a brief way, to take into consideration a few of the most important things we should know before starting the preparation of a tooth for a three-quarter crown.

The three-quarter crown is adaptable to the six superior and inferior anterior teeth, but is applicable to most teeth in the mouth, unless it is the third molars and short, cone-shape first and second molars and lower bicuspids.

For the sake of convenience, we will take up the preparation of a superior central incisor. The first thing, after the toilet of the mouth has been completed, is to gain separation of the teeth that we may not injure the adjacent teeth. It is frequently better to protect them with the matrix or any other means at our command. After the separation we are ready to make the initial cuts. This is done with a safe-sided or a "jodandy" carbo-disc. My preference is the "lightening" disc because it is thin and very durable and easy to keep cool. The two initial cuts are accomplished by removing the contact points of the mesio and disto-lingual angles, reaching to the gingival at these points.

The manner in which the disc or stone is held is important. The disc should be held in such a manner as if a straight line was drawn through the long axis of the tooth and the upper part of the disc should lean toward this line and never away from it. In the event we carry the cutting away from this line we should destroy too much tooth structure in the area of the gingival angle and the same proportion of the tooth above would have to be cut away in order to allow the wax crown to draw. This also has a tendency to weaken the preparation and causes the tooth to be more or less hypersensitive. Thus the importance of the preliminary separation.

The next step consists of removing a sufficient amount of the lingual plate of enamel to allow the proper preparation and protection of the incisal end. This is accomplished with an ordinary heatless wheel stone. After the incisal end is properly beveled I take an inverted cone stone No. 234 and make a groove or step from mesial to distal, finishing same with an inverted cone bur No. 40 or 41. The bur, because of its shape, produces an acute angle at the junction of the incisal with the labial and lingual plates, adding greatly to the resistance against lingual displacement. The next step is to groove the mesial and distal sides of the tooth paralelling the incisal third of the labial plate, terminating in the extreme gingivo-labial angle. This is done with fine tapering cross-cut fissure burs No. 700 and 701. This will carry the margin to practically immune area. These grooves never should parallel the long axis of the anterior teeth but must do so in bicuspids and molars. The reason for this is to gain strength by adding greater bulk to the crown at the gingival, as well as to increase the circumference at the gum and lessen the danger of lingual displacement.

The preparation of the mesial and distal sides, as well as the lingual, is accomplished with vul-carbo discs and conical shaped carborundums. We dress away sufficient enamel and dentin, and frequently just the enamel, until the crown will draw from the line where we have previously determined the gingival margin shall be. This finishing line is definitely outlined and is done with the smallest cylindrical shaped carborundums and No. 701 and 702 burs. Most of these carborundums are blunt when you get them and the way I point them is to place them in a foot engine hand piece and revolve them against a revolving stone in the lathe or electric engine. After smoothing the surfaces just mentioned with fine sand-paper discs and shaving the margins of the grooves with a sharp chisel we are now ready to take a wax impression.

We select the proper size seamless copper band and adjust it to the tooth being careful not to injure the gingivæ. I use either Taggart's or Maves' wax. I select a suitable size cone and soften in hot water to proper consistency then place in the band and pack it firmly. Next I cut out a portion corresponding to the labial side of the tooth. After this is done I press it down over the tooth, holding it firmly until the wax is chilled thoroughly. I then remove the band by cutting the labial side, and gently sliding it upward. Our wax pattern is then in the shape of a cylinder. We next carve the wax to the desired form, which is as near a duplicate of the original tooth as it is possible to make. We then draw the wax crown and invest carefully, using Dr. Maves' method. I will not go into detail about the investment nor will I describe any of the posterior teeth preparations, except the full-jacket crown. I wish to state however, that the preparation of a posterior tooth for a three-quarter crown is very similar to the preparation of a tooth for an M. O. D. inlay.

The full-jacket crown is usually applied to the short, cone shaped, and not the bell-shaped tooth. The preparation consists of the removing of the contour of the sides of the tooth with vul-carbo discs and carborundum cylinders just enough to facilitate the removal of the wax crown and placing the cast gold duplicate to the line where you have previously determined the gingival shall be; provided a casting gold of sufficient strength is used. (Dr. Tinker's "T" gold is recommended.) Simply restoring the contour will give all the strength necessary, the shoulder being merely a definite line, or a slight indentation, around the tooth at that point. Next, we will consider the occlusal surface. I use inverted cone carborundum stones No. 234, and other small cylindrical stones, for removing the enamel from the sulci and the points of the cusps and occlusal planes. When this is completed it should merely be a reduction in the height of the tooth. We remove from one m.m. in the sulci to one-half to two m.m. on the cusps, depending upon the nature of the articulation. This allows us a maximum amount of tooth structure over the pulp horns, as well as adding from one-third to one-half of the frictional stress from the occlusal to the gingival over the old method of dressing down the occlusal to a flat surface with a large wheel stone.

After all this is done, we next select a band that fits the tooth snugly, trim it to conform to the gingival, fill it with modeling compound and while warm press it into place, chill and remove. This gives us an impression of the stump. We next trim away all excess compound. After filling a Mellot's rubber ring full of plaster, I press the copper band down into the plaster, as it starts to set, about one-fourth inch below the margin of the band. After plaster has set, I mix a portion of amalgam to a sloppy consistency and fill the impression up to the top of the plaster, thoroughly condensing same with a mallet and wooden plugger. This gives us a die. I allow this die to set about 24 hours. I next select another band and trim to suit the case, then cut it away so that when the teeth are in occlusion it does not interfere with the articulation. Then I fill it with Taggart's wax and press it to place while warm and have patient close his or her teeth. Next we remove and place it on the amalgam die. I split the copper band, remove, carve and contour to desired form and replace on the tooth. Then, if satisfied we remove it, invest and cast a duplicate. I try this on the tooth, and if it does not go down to the desired place replace it on the amalgam die, carry it to my Coates' swager and swage it to fit the die. When I replace it on the tooth it fits.

This carries us to the point of taking the bite and impression. I follow Dr. Tinker's method as nearly as I can. He takes a full upper and a full lower impression in modeling compound. The lingual sides being taken in S. S. W. black compound and the labial and buccal in red compound. In taking this impression I select a Supplee's tray No. 5, heat the black compound to the desired consistency and place on tray like I was going to take an ordinary impression. Place in the mouth and push it to position, then hold until the compound is chilled. I then take a sharp lance and remove all the compound from the labial and buccal sides. After this is done I remove the whole impression. If it is accurate, I then replace same and prepare to take impression of labial and buccal sides. This is done with Kerr's red compound made in sections. This being done we chill and remove the outer portion and then the inner portion. After the removal of all the impressions we assemble the same and compare to see if any mistakes have been made.

When the impressions of both jaws have been made we remove crowns, place in impressions and pour with a good fire-proof investment. The opposing impression is poured with cement or amalgam, especially the portion of it that comes in contact with the bridge on opposing model. These are then articulated on an anatomical articulator so that we can get the proper occlusion planes established, without having to destroy them by grinding to place after we have put the bridge in position. We now select our facing which is a long, blunt pin type, and bake porcelain roots or tips on them. If the root is to go into the socket it should be from one-half to two-thirds the length of the original root. I really think this method should apply only to the anterior teeth, never using the roots in the posterior part of the mouth, using tips instead. I will not go into the detail of this portion of the technic, but will say, that in constructing these dummies it is absolutely necessary to reproduce the tooth as nearly as it is possible to do.

In removing the wax patterns from the facings, it is necessary to place carbon points in the pin holes to keep them open when reproducing the cast. These dummies after casting, are assembled and tacked with 22K. solder. This lessens the possibility of expansion and contraction as would be the case if we made the greater portion of the bridge with solder. It is best to cast several dummies in one piece, when possible, in order to reduce the soldering to the minimum. We must not have expansion or contraction if we expect to get our completed bridge in place.

Where the long roots are used the teeth are never extracted until the bridge is made, and the bridge should be set with oil of cloves and cement powder for a period of three weeks, when, it is removed and set permanently with cement.

Dr. Tinker has many short cut methods in doing this class of work but I will not take the time to explain them as my paper would become very tiresome, so in conclusion, I will tell you something of the effect it has on my patients.

In the past year I have constructed quite a number of these bridges, and while I have had one or two that puzzled me very much, I have never failed to place the completed bridge in position after a thorough study of the conditions that prevailed.

The better class of my clientele prefer the Tinker system of crown and bridge restoration when the esthetic effect is explained and comparison is made between this and the old method of construction. In placing the roots into the tooth sockets we keep down absorption to the minimum, and this feature alone is worthy of much favorable comment from the patient; and, the comfortable, natural feeling on the lingual side is also very pleasing and enables the patient to get accustomed to the bridge quickly. Thus far, every piece of work of this kind I have constructed has given one hundred per cent. satisfaction to the patient. It also gives me the satisfaction of knowing that I am doing a good work, and I sleep better at nights since I have discontinued the custom of devitalizing perfectly good teeth for Richmond Crowns, as well as some other methods of preparation of bridge abutments.

SYMPOSIUM—SOME PHASES OF PYORRHEA AND ITS TREATMENT

PREDISPOSING FACTORS OF RIGG'S DISEASE*

BY S. B. RIGGS, D.D.S., SAN ANTONIO, TEXAS

IN TAKING UP THE STUDY of the predisposing factors of a so-called Pyorrhea infection it is necessary for us to take into consideration a number of outstanding features which can be found in a majority of cases, some of which predominate in some cases, while in others we find other groups predominating.

Pyorrhea Alveolaris is a disease which, as a rule, begins at the gingival border and progresses towards the apex of the root; it has a variety of causes; the principal ones we, as dentists, should be interested in, are: Mal-occlusion, poor dental work acting as a mechanical irritant, poor contact points, traumatism, and the volume and type of oral flora.

Conditions which should be taken up with a physician are, lowered resistance, other existing infections, constipation, insufficient amount of liquids, kidney involvments, occupation, environment, degree of intelligence, anemia, type of saliva and its contents, particularly the amount of ptyalin contained therein.

Saliva plays a very important part in maintaining healthy conditions of the mouth; ptyalin is that element in the saliva which changes starches into sugar or maltose; and, where we have an insufficiency of this element, this change is not complete and we have deposited around the necks of the teeth and at the points of least resistance, a pabulum composed of a starchy sweetish mass, in which we find maltose, starch, mucin—broken down mucous membrane, streptoccoccus, staphylococcus, necro-buccalis and many other of the common bacteria, which inhabit the mouth. These bacteria are found both in an active and passive state. These are some of the things which go to make up the so-called bacterial plaque. In the presence of moisture and heat and the absence of sunlight, fermentation occurs very rapidly, for, bear in mind, we have at least two complete generations of bacterial life in the mouth every hour. These decomposing organisms deposited at the necks of the teeth, throw off toxins which, in turn, create an active inflammation, and we have a drawing away of the soft tissues from the necks of the teeth, which in turn, exposes the peridental membrane to infection by the active bacteria.

The rapidity of bone destruction depends on the volume of bacteria and the resistance of the tissues. This germ invasion is secondary, as there first must be a fertile and inviting field and a lowering of vital resistance before it is possible for the individual to become infected from his own flora. However, once this infection has taken place and inflammation is established, which greatly increases the amount of serum, and, should this serum contain Calco-globulin, serumal calculus will be deposited. It is readily understood that this is not the cause of the disease, but only a result, although it does act as an irritant to the peridental membrane.

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*Part One of the Symposium, presented at the Annual Convention of the Texas State Dental Society at Dallas, March 3-5, 1921.

Investigations, as far as dental records go, have never been able to develop a pyorrhea infection by injecting the pus into gum or peridental tissue; however, in rabbits and guinea pigs the teeth may be loosened and inflammation established, or, the teeth tightened and inflammation reduced at will, by diet and proper elimination. Particular attention must be paid to elimination. The patient's physician should be consulted and a proper elimination established. Any systemic disorder which produces alteration in the quantity or quality of the blood stream would, of course, be a predisposing factor and would require medical advice and treatment by the patient's physician. We are speaking now of the various auto-intoxications which may act as systemic predisposing causes. These disorders are responsible for the lowering of the defensive forces of the body, and this decrease of vital resistance is perhaps nowhere more pronounced than in the investing tissues of the teeth. For, as pointed out by Talbot, the peridental membrane alveolar bone, gingiva and gums, are, in the nature of end organs, particularly devoid of collateral circulation and are consequently very sensitive to circulatory changes. Any systemic derangement should be viewed as a predisposing factor. They render the field more liable to an infection by reason of establishing in those structures areas of decreased vital resistance, thereby, causing one condition to incite an infection, another condition to perpetuate it.

Summary:

Lack of knowledge in diagnosis by dentists.

Falling into the error of becoming physically alert and mental drones.

Bear in mind we are dealing with a bolting, constipated, toxin developing race.

That the peridental membrane must be exercised.

That over-instrumentation is fatal.

That the responsibility of changing the condition under which the disease develops must be on the patient.

That it is criminal negligence on the part of the dentist when he fails to teach the patient an adequate system of Oral Hygiene.

Let us live up to the standards of a profession which has given us a Morton, a Wells, a Miller, a Black and a Hartzell.

Let us know what we are about. A student once asked Dr. G. V. Black what he considered the very best filling material; his answer was "Brains."

THE IMPORTANCE OF DIAGNOSIS IN THE TREATMENT OF PYORRHEA*

BY L. P. ROBERTSON, D.D.S., MARLIN, TEXAS

AS RATIONAL TREATMENT of any disease must be based upon a correct diagnosis, and as diagnosis of pyorrhea cannot be properly studied apart from the general physical condition, I want to call your attention to a few points to be considered when a patient presents for treatment. Perhaps the greatest problem that has confronted the dentist in the past has been to determine when to conserve and when to extract diseased teeth. And while this problem is still difficult of solution, modern methods of diagnosis are of great aid in determining what is best for the patient and the dentist. In the first place, differential diagnosis or the character of the types of the lesion must be studied. We might in order to be plain, call this Classification. In considering types and conditions I will leave out all theories as to the histo-pathology of the disease except to state that the organisms present are practically the same in all types, and to further state that all pyorrhea is due to bacterial growth, and that these germs are present in all mouths, healthy or otherwise, from the babe of a few hours, all through life. But they are harmless so long as there is perfect nutrition and elimination, the general physical condition is normal or as long as the mouth and teeth are normal. This is an exacting requirement, but we must remember that Nature is exacting in compliance with her laws. We are told by pathologists that all changes are bacterial, chemical or mechanical and, in pyorrhea, we have all three changes.

CLASSIFICATION OF DIFFERENTIAL DIAGNOSIS

When the patient presents for treatment, we should give careful consideration to the progress the disease has made; in doing so, we must not overlook the importance of considering the so-called minor cases, such as a slight gingivitis, for it denotes pathological condition, and the patient is entitled to our advice. The next class of cases is where we have exuding of more or less pus and absorption of process, with or without recession of the gum, and pockets of greater or less depth, affecting some or all of the teeth; but, where all, or nearly all of the teeth are amenable to treatment and may be conserved, provided there are no constitutional contraindications, which will be considered later in this article. From this class, we will go into those cases we are so often confronted with, that present the greatest problem we have to contend with. I refer to those cases where a third or more of the teeth are involved, and the others can be conserved for at least a number of years. There are many factors to be considered in these cases. We all know how reluctant most people are to give up all their teeth and resort to full dentures. And here is where our best judgment should be exercised; for many times dentists are swept off their feet by overpersuasion on the part of the patient to induce the dentist to leave some teeth in the mouth. In all three of the above classes or stages of pyorrhea, we may or may not find deposits, but it would be a conservative estimate to place 90 per cent. in the class with deposits. The hardest cases to control are those with little or no deposits. After having made a clinical examination of the mouth and teeth with the diagnostic lamp, with probes, and pressure on the gums, and noting the occlusion and any other abnormal local conditions, a careful inquiry is made into the patient's general physical condition, and, if a diminution of the general health is shown, especially of a chronic nature, manifested usually by general debility, weakness and lack of "pep," loss of weight, neuritis, arthritis of long standing particularly, or any of the symptoms of so-called rheumatism, indigestion, or, if there is heart weakness or any symptoms of kidney lesion the patient is referred to the internist for a blood count, urinalysis and blood pressure test. Radiographs should be made, usually, of all the teeth. Dr. Tom Hinman says that nowhere in dental diagnosis is the X-ray so valuable as in pyorrhea. The laboratory findings will be a great aid in deciding if the prognosis is to be favorable or unfavorable; mainly from the urinalyis; for the prognosis is never favorable in cases with serious kidney lesions. Again, the findings will help to determine what would be a safe procedure as to the amount of scaling and curetting or other surgical procedure, you contemplate making. And it is highly important to be conservative in this respect, even with patients in fairly good health; with those suffering with a kidney lesion or extreme weakness and low-blood pressure, it would be at a great risk to the patient's life to do any radical surgery. Hartzell gives as a guide or standard the following: "An individual with the full complement of red cells—5 million to the cc of blood; with a hemoglobin of at least 85 and a leucocyte of from seven to eight thousand to the cc, together with a normal digestion and a reasonable amount of energy, is safe in conserving any of his dental organs which might present for treatment." When scaling and curetting are done, or any other surgery, in the septic mouth, a shower of bacteria is turned loose, vaccinating the patient with live germs, and there is a decided reaction manifested by a septic chill, followed by extreme weakness if the operation has been too radical. A blood count showing low reds, low hemoglobin, low leucocytes and low polys, and a low-blood pressure, indicate a chronic condition of weakness and a weak heart. If this condition is complicated with kidney lesion, we should be very cautious in our procedure; scaling and curetting only a few teeth at first sitting, or extracting only a few teeth at a time, and advise the patient to take complete rest for several days before returning for further treatment. The practice of extensive extraction operations without ascertaining whether the patient is able to withstand the shock is to be condemned.

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*Part Two of the Symposium, presented at the Annual Convention of the Texas State Dental Society, at Dallas, March 3-5, 1921.

The principal value of radiographs in diagnosing pyorrhea lies in determining the extent of the absorption and the density of the bone remaining around the teeth. Hartzell's guide is, if the absorption has extended more than half the length of the root the prognosis is not favorable, but I think we should be guided largely by the type of the lesion and density of the bone remaining around roots of the teeth, for it is astounding how little bone will support some teeth for almost an indefinite period, if it is dense and the teeth are kept clean and the bacterial growth is controlled. While good clear X-rays of the teeth are of value in diagnosing pyorrhea, no case can be properly diagnosed by the X-ray without the clinical examination; yet, I would not have it understood that all cases which may present for treatment will call for all of the above procedure. Indeed, it is far from my purpose to make the subject of pyorrhea treatment any more confusing than necessary for, in my opinion, in our past consideration of pyorrhea, no phase of dentistry has had more attention in theory with less success in practice. And instead of adding to the maze of mystery and doubt that has befogged the average mind on this subject, and has deterred many good and intelligent dentists from undertaking to treat pyorrhea with confidence of success I would rather offer encouragement. We are getting more light on the subject and more pyorrhea is being treated successfully as we learn more of the nature of this disease.

THE IMPORTANCE OF OBSERVING THE SEPTAL GINGIVA IN THE EARLY DIAGNOSIS OF DISEASED GUMS*

BY GEO. H. MENGEL, D.D.S., EL PASO, TEXAS

THE LAST DECADE has demonstrated the fact that more infection enters the body through the mouth than through any other organ of the body; and, knowing what harm an inflammation or suppurating conditions, as Pyorrhea and Vincent Stomatitis, can cause, an early diagnosis and proper treatment of the disease tend toward an earlier cure with less destruction of tissue, less loss of time and money spent by the patient, and better appreciation of the services rendered. It behooves us to lay stress on the early diagnosis of these diseases.

My purpose is to call your attention to some of the markings on the gums, particularly the septal or interproximal gingivus that look innocent, but which in reality are the beginning of pyorrhea. Thomas B. Hartzell says, "That all gingivitis is, in the beginning, streptococcic." The septal gingivus is the most important part of the gum in which we can detect even the smallest amount of inflammation, owing to its susceptibility to injury, to its important location, shape and histology. Its importance is due to the fact that it lies between two teeth and is supported by the interproximal fibers connecting the teeth, and each septal gingivus has two subgingival spaces, mesial and distal. Its shape being a wedge, and the apex a knife edge, any change in the structure of the base will show a defect or change in the apex.

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*Part three of the Symposium presented at the Annual Convention of the Texas State Dental Society, at Dallas, March 3-5, 1921.

Drs. G. V. Black, F. B. Noyes, and Serres have demonstrated epithelial tissue in the septal gingiva.

Dr. G. V. Black states the following on page 20, "Special Dental Pathology": "If this mass of lobulated epithelium is a gland at all, it is a ductless gland of very small dimensions. It is easily seen and tissue can be well studied. If ducts were there, they could easily be found. I can not think now of this bit of lobulated epithelium as of any special importance. But the regularity of its appearance in this position, and the fact also that in comparatively recent time certain ductless glands of small size have been demonstrated to have functions of great importance, should cause us to be careful about casting this matter aside as unimportant. Some one may yet find it to be of physiological importance in the performance of some, as yet unknown, function."

The liabial and buccal surface of the septal gingiva show more changes, due to being thinner, than the lingual. The change most frequently found in early diseased conditions is a sagging of the apex and is indicated first by observing a line drawn near the base of the septal gingiva.

Noyes states, on page 289, "Dental Histology and Embryology": "The fine fibers of the peridental membrane can be followed for about half the distance to the epithelium before they are lost in the coarser mat of the gum tissue, and a fairly definite boundary will be seen between what should be gum tissue and peridental membrane. As the disto-labial angle of the root is approached, the fibres passing from the cementum tend to swing around distally and pass to the mesio-labial angle of the adjoining tooth. Along the proximal surface, the networks which support the interproximal gingiva, are well known. The fibers springing from the cementum interlace and pass around blood vessels, and fibers are passing up into the gingivus, and finally are inserted into the cementum of the next tooth. In this way it will be seen that the teeth in the entire arch are firmly bound together in the gingival portion. This explains the way in which the position of all the teeth are affected by the loss of a single one in the arch, and the way in which the movement of one tooth, will draw its neighbor after it." "The first step in the sagging of the interproximal gum tissue is the cutting of the fibers from the cementum where it bends occlusally, following the curve of the gingival line in the proximal surface."

In a severe acute case of Vincent's Stomatitis, the septal tissue suffers more destruction and infection is retained longer in this location. The gingival boarder is first attacked. After a partial or complete recovery or in an old chronic case, the gingiva is rounded and in many cases there is loss of tissue. When in doubt, this disease can be readily diagnosed by making and examining a smear of the debris of the subgingival spaces. Early treatment can be given and tissue saved.

The general practitioner has the first opportunity to detect even the slightest gingivitis, and it is his duty to inform the patient of its presence and seriousness, and to correct the conditions immediately.

We have often caused a gingivitis, and later a severe case of pyorrhea and even loss of one or more teeth by lack of care in Operative Dentistry. It should be our aim always to recognize the importance of preventing any irritation of the gingiva by the proper construction, insertion and finishing of fillings, inlays, crowns, bridges and removable appliances, and above all educating our patients to recognize the difference between thorough prophylatic treatment and the camouflage cleaning.

We must remember that gingivitis and pyorrhea are different stages of the same disease, and also to explain this fact to our patients. In the words of Dr. G. V. Black, "If each dentist, will bring himself to realize that he may be preventing the loss of the entire denture every time he prevents or cures a slight gingivitis he will come to really appreciate the value of this service."

THE PATIENT'S SIDE OF PYORRHEA*

BY L. C. SNOWDEN, D.D.S., DALLAS, TEXAS

IT IS THE DUTY of every dental surgeon to either treat pyorrhea or refer the patient to a pyorrhea man. This should be done in all stages of the disease that the patient may maintain a good firm attachment. If the practitioner does neither, and attemps to treat the case by the average cleaning until it becomes impossible for the pyorrhea man to maintain a proper attachment, then the tooth or teeth are lost. If the practitioner does not treat pyorrhea it is but right that he should send the patient to a pyorrhea man.

The duty of the pyorrhea man then comes as to the diagnosis and prognosis of the case. He must attempt to determine the exact, or as near as possible, by exploration and X-ray, teeth which can be saved and which ones must be extracted. This must be strictly adhered to, and we must not promise to save teeth that have not sufficient bone to maintain a healthy tooth after treatment of said tooth, because after a long seige of treatment if the patient then loses his teeth, he also loses faith in the specialist and general practitioner. Whereas, if the case is referred when it is possible to maintain good attachment of teeth it reflects credit and honor upon both. But we cannot bring back the lost teeth and should not be expected to, as the only time they *can* be saved is before they are destroyed.

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*Part four of Symposium, presented at the Annual Convention of the Texas State Dental, Society at Dallas, March 3-5, 1921.

The training of the patient, from my ten years of experience in the treatment of pyorrhea and seeing other cases that have been treated and attempted to be treated, is, that the practitioner does not do his duty in the training of the patient as to properly cleaning his teeth This should be done, not by simply telling him to go home and keep his teeth clean with his tooth paste, or powder, or this brush or that one; for the patient cannot depend entirely on cleaning his teeth with any of the pastes or powders that I have found in the market. For I can't myself. We do not use such materials in cleaning them, and we cannot expect a patient to do more with his brush in hand than we do with our electric motor and brush. Therefore, my opinion is that until we give our patient powdered pumice stone and teach him how to properly cleanse his teeth, and by this I mean to supervise his case until he does clean them, and learns to keep them clean, our treatment will be of no avail. He can accomplish this with a hard bristle brush, brushing up-and-down and with a rotary movement, *with* and not across the teeth, using pumice stone every four or five days. It is not an easy task to train a patient to properly brush and cleanse his teeth, but it is the thing and only thing that will save them. And he has the right to expect us to teach him to properly perform his prophylaxis. We must have the patient take his brush and brush his teeth before us, that we may be able to see in the beginning what his efforts are; also we must see what they are going to accomplish from day to day by having them use the brush our way, as we have attempted to teach them, in order to develop each individual patient's skill in the use of a tooth brush. This is just as essential as the treatment of pyorrhea and the putting the mouth in a good healthy condition. And, we are not going to accomplish much toward our goal until we are able to train the children in the schools how to cleanse their teeth and mouths.

By this method and this only can the people hope to maintain their teeth through life, and if the dental profession of America does not wake up, the American people will be toothless like the French and English, who have lost their teeth simply because they did not know the first principals of oral prophylaxis. We have not saved teeth in the past by merely placing fillings in cavities formed, or by extracting the ones that we could not fill or crown. They can be saved in one way and that is by preventing decay and pyorrhea; and this can be done in one way only, that is, by keeping the teeth clean. Whose task is to it do this? It is the dental surgeon's God-given privilege to do this thing in life.

(Part Five of Symposium on next Page.)

SURGICAL TREATMENT OF PYORRHEA*

BY J. S. MCMINN, D.D.S., TYLER, TEXAS

TRULY IT AFFORDS me the greatest pleasure to have the opportunity of presenting a paper to this great body of co-workers, and especially so upon such a great subject as has been assigned me.

Just why I was chosen to act in this capacity by your executive committee, I am not able to say. It is true I am an optimist and am ambitious when it comes to the treatment of pyorrhea alveolaris. I received a postal card from the Executive Committee about two months ago asking that I prepare a paper on some subject of interest to the profession, to be read at this meeting. I suggested the subject, Surgical Treatment or Pyorrhea, because I thought it was the most needed and the most neglected dental operation of the average dentist of today. However, I had no idea that I would be called upon to prepare a paper, because I thought that every dentist in the State had received a like card and that there would be many to offer papers that are older and more experienced than I. The only plausible theory I can conceive for the selection of myself is that so many offered to give papers on this subject that it was difficult for the committee to decide who should be chosen, so, with closed eyes they drew from a hat containing the names of the volunteers and I was the one drawn. So please excuse the committee for the unlucky drawing and bear with me for a few minutes, as I will not keep you long.

If I succeed in advancing a theory, or thought, that will benefit a single member of this great body, I will certainly feel that my efforts will not have been in vain. I am not going to present to you something that is so scientific that it will be impossible for any of you to do but just the common every day procedure of the essayist. I sometimes think that the great trouble with the profession is that too many of us think that it takes a scientific man and scientific treatment to cure pyorrhea. Well, it does not any more than all dentists are scientific, but, on the other hand just a sane common sense routine of prophylactic procedure.

There are, and there have been, more teeth lost by the ravages of pyorrhea than by all the combined dental maladies, and yet there has been more time spent, more efforts made in vain, and more different methods of treatment than for any other dental ailment.

In order to treat a disease with the expectation of accomplishing a cure, we have got to know, or it is very essential that we know the cause of the disease. There has been many theories put forth as the cause of pyorrhea. Some say that it is an infection, some say neglect, and some say that it is a bone disease. I believe it is a constitutional disease of the peridental membrane, and can be contracted through neglect or exposure as can tuberculosis. I do not believe it is a bone disease; if it is, why does extracting accomplish the cure? It is true that the bone is affected approximating the diseased parts, but we know that the disease does not start in the bone, therefore, could not be termed a bone disease. But, regardless of everything that has been done, we seem to have the disease more today than ever before. So the important question today is how best to treat the cases as they come to us most every day. I believe the surgical side is the most important. If the seat of infection is removed, nature will in most cases take care of the rest.

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*Part five of Symposium, presented at the Annual Convention of the Texas State Dental Society, at Dallas, March 3-5, 1921.

I have seen men that try to cure pyorrhea without removing the deposits from the teeth, and try to cure a hypertrophied gum, caused from a gold crown that was almost twice too large and extending about two millimeters below the free margin of the gum, by painting with iodin. This, in my mind, is like trying to cure a wound caused from a thorn in the flesh without first removing the thorn. First remove the cause, if possible, and then the results of the cause, then with the assistance of nature, the greatest of all the healers, assisted by proper prophylactic measures I believe all cases of pyorrhea can be held in check or cured.

I remove all the deposits as soon as possible, going around all the teeth at each sitting; but I do not continue to scrape the roots until there are grooves cut in them. Too much instrumentation is injurious, in my mind. I do not expect a reattachment of the tissue to the teeth, where it has been once destroyed. Many times the loose teeth are due to the great amount of inflammation of the gums, due to the different causes, and as soon as this inflammation is allayed the teeth are again tight, and many times we speak of it as reattachment taking place. I do not believe, in many cases of pyorrhea, new bone is formed, as the system is in a rather low state of resistance and therefore, its rebuilding process is not very great. I do not believe that peridental membrane once lost can ever be replaced, but that that which is not entirely destroyed can be regenerated to almost normal.

Now that all the causes, as well as you are able to determine, are removed, you will find in all second and third stage cases, more or less hypertrophied gum tissue.

This tissue, together with all pockets must be removed, and the most efficient way of doing this is by the use of the electric cautery. It is a short operation and almost painless. I never have to resort to an anesthetic. So long as you do not let the cautery come in contact with the teeth you scarcely have any sensation. You can touch a place two or three times in succession with the cautery at a white heat, without the generation of enough heat to cause an uncomfortable feeling. Of course, if you let the cautery come in contact with the teeth you have a severe pain, due to the conduction of heat to the pulp of the teeth. I do not try to do the whole operation in one or two sittings. I believe by trying to do too much at one sitting you will destroy tissue, that, if you give a chance, will be saved.

All pockets should be run out as soon as possible as this is essential to the life of the tooth as well as to the welfare of the patient. I do not have any faith in trying to keep a deep pocket sterile or free from infection to the degree that new bone will be formed. I have seen teeth that were made very serviceable and not detrimental to the patient that from one half to the entire length of the root was exposed. Of course this was on one side only, and in cases that would not cause an unsightly appearance. Many lower incisors and superior molars can be saved that are otherwise lost, if this operation is performed. In case of very narrow pockets I usually paint the sides of the burnt tissue with a solution of silver nitrate to prevent a reuniting of the tissue.

The therapeutic action on the tissue, resulting from the electric cautery is very much greater, in my mind, than by the use of the lancet or gum scissors. The scar tissues formed from the burn seems to hug the necks of the teeth much more firmly than it does as a result of using the lancet. And the tissue seems to heal more readily and is not so sore as when it is cut. This is possibly due to the fact that the cautery sears the tissue to the extent that it is not reinfected as in the case of a fresh cut.

Some men advocate the removal of the edges of the alveoli around the seat of infection, claiming that the peridental membrane is destroyed in advance of the alveolus. This may be true but I never have had to resort to this operation. Possibly in passing the cautery in between the teeth and around buccally and lingually this diseased bone is destroyed as is the soft tissue.

Gentlemen, summing the whole thing up, I think the electric cautery is the ideal treatment for pyorrhea, or as near as we have found so far. The reasons I give for this statement are as follows:

(1) The cautery will remove any tissue that the lancet will. (2) No hemorrhage to speak of. (3) By careful and judicious procedure it is almost painless. (4) Less soreness of the gums. (5) Heals sooner and hugs necks of teeth tighter. (6) Last but not least, is a much shorter operation.

This is my treatment until I have found something better. The Mercitan treatment looks good to me, though I do not know anything about it clinically. If it destroys this dead and diseased tissue as it is claimed to do, it is what I have been working for and thinking would be the cure for pyorrhea. If we could apply to the gum, in case of pyorrhea, some drug, or otherwise, and have the same result as we have in the application of silver nitrate and formlin to the diseased pulp, we will have found the cure for pyorrhea. So let us hope that Dr. George S. Staples, of Texas, has discovered the greatest cure of all time, speaking from a dental standpoint.

DISCUSSION OF SYMPOSIUM

SOME PHASES OF PYORRHEA AND ITS TREATMENT

The discussion was opened by Dr. Julian Smith, of Dallas. He had prepared comments upon the paper of Dr. Riggs, but did not confine himself to it, commenting upon certain points contained in the other papers, especially that of Dr. Robertson. He said that he disagreed with Dr. Robertson that X-ray examinations of pyorrhea cases were essential; but asserted his belief that they were not more than of secondary importance as a diagnostic measure; and stated, that the stability of the teeth was the main factor and guide in making a diagnosis.

He then read his discussion of Dr. Riggs' paper, as follows:

DISCUSSING DR. RIGGS' PAPER

Dr. Julian Smith, Dallas, Texas: Preventive Dentistry, like Preventive Medicine, is the most important feature in the practice of Medicine today, and, to recognize and arrest the predisposing factors at their earliest stages, is imminently essential.

The Essayist has covered the ground in a most concise and comprehensive manner, especially with regard to the systemic predisposing causes, but has left the local causes to care for themselves. In my estimation, if there were no local predisposing causes, there would be no Pyorrhea, consequently, I wish to call attention to them as a sort of amendment to Dr. Rigg's most excellent paper and add, that as dentists, the local causes are of vastly more importance to us than those of systemic origin.

I think the question of Pyorrhea and its relationship to systemic or organic disturbances, is similar to the ancient unsettled question of "which came first—the hen or the egg." Viewing the question from, I must admit, a biased standpoint, I am firmly convinced that "the jaws and that which they contain," which, I think, covers the Pyorrheic territory pretty thoroughly, are a decidedly greater menace to the general organism of the body, than the reverse, as is evidenced by the fact that many very grave organic disturbances occur in people under 15 years of age, with practically no permanent deleterious effect on the jaws and their contents, whereas as years creep on and accumulative local predisposing causes gradually disintegrate soft tissues in the Dental Arch, producing inflammatory conditions and an open gateway for the invasion of bacteria, we have, as a result, a variety of foci of infection and consequent organic disturbances which, in many instances, are entirely cleared up by the removal of the local disturbing factors. I do not intend to belittle or deny the importance of lowered resistance as caused by systemic predisposing causes, as a contributory factor in the production of a Pyorrheic condition, nor, do I overlook the importance of medical consultation and treatment of same, but I do claim that local predisposing causes must be removed as the initial step, an adequate system of mouth hygiene be established on the part of the patient, and a general systemic and personal hygienic regime sustained, in regard to diet, exercise and elimination.

So much has been written and said about the usual local predisposing causes for this condition that there is nothing new to suggest. The treatment of Pyorrhea is simply a "clean up" campaign and correction, as far as possible, of existing conditions which would tend to produce an initial Pyorrheic infection, as happened originally. This can be accomplished in some cases by instilling into the mind of the patient the importance of Mouth Hygiene and periodical visits to a competent Periodontist. Poor contact points must be corrected. Traumatism must be reduced as far as possible, but mal-occlusion, in most instances, requires continuous care from the operator, with the chance largely in favor of a gradual retrogression. A great deal could be said along this line, but I feel that it would be only a rehash of what is generally written and already digested by my audience. I want to thank the Essayist for a most interesting and valuable paper and those present for their tolerance of this criticism.

Dr. W. H. Scherer, of Houston, having also prepared a discussion of Dr. Riggs' paper, presented it as follows:

DISCUSSION OF DR. RIGGS' PAPER

Dr. W. H. Scherer, Houston, Texas: In a brief paper, our essayist has given us an interesting resume on this subject. Dr. Riggs, by giving his subject matter in brief style, has no doubt hoped that those who will discuss his excellent paper will follow his example.

It is unfortunate that we have not, as yet, reached a definite opinion as to the etiology of this disease. There has been a vague and controversial element introduced by our foremost men, who are recognized authorities in this subject. This gives rise to doubt and confusion in the minds of the student of periodontal diseases, as to which conclusions are correct and a proper and effective method if treatment.

The American Academy of Periodontists has accepted and adopted a nomenclature, which, I think, should be adopted by all scientific societies and used in their discussion of this subject.

The periodontium is made up of pericementum, alveolus, alveolar gingiva and marginal gingiva, which last includes the interproximal gum margin. Diseases which attack these tissues are grouped under the title "Periodontoclasia," this term meaning destruction of the tissues immediately surrounding the teeth. The subtypes of Periodontoclasia or Dental Periclasia, are classified according to the tissue which is the center of the attack. Analysis of these disease conditions reveals the fact that we are dealing with several fairly distinct types. Thus, we have Recession; Gingivitis; Pericementoclasia, to which type the name Periodontoclasia in a limited sense may be applied, Alveoloclasia, and Periodontal Abscess. Once these basic types are firmly fixed in one's mind, diagnosis becomes a matter of noting the tissues involved and the character of the disturbance.

Recession and Gingivitis are confined largely to the gum margin. Pericementoclasia is primarily a destruction of the pericementum, thus leading to the formation of the so-called pocket; it, of course, involves destruction of alveolar bone, but this is a secondary phenomenon in this type. The outstanding feature of Alveoloclasia is the absorption or destruction of aveolar bone without corresponding loss of the pericementum. In this type there is no pocket formation, yet the tooth exhibits mobility due to loss of bony support. Periodontal abscess needs no definition. It has two subdivisions, apical, originating from a pulp disturbance and with which we are not at present concerned; and parietal, not of pulpal origin, but located either in the pericementum at the side of the root or in the gingival tissue overlying a previously formed pocket. Having adopted these types, which admit of suitable subdivisions, we can say, for instance, that this tooth exhibits Gingivitis and Suppurative Pericementoclasia, while that one shows Recession and Alveoloclasia. This avoids the necessity, obtaining in past years, of saying that both cases are pyorrhea alveolaris, and trying to figure out how two cases can show conditions so totally different if it is all one disease.

Just as we find variations in types of periclasial disease, so we naturally find variations in the pathology and etiology in cases coming under our observation. The pathology of a simple recession is vastly different from that of a suppurative pericementoclasia, just as the etiology of gingival abscess differs from that of alveoclasia. The etiology of periclasia, like periclasia itself, is a composite consisting always of two or more factors, often widely different and varying in their relative importance from case to case, but always a combination of two or more forces working together for the destruction of periodontal tissues. Any one of these factors may be found alone, and will when so found, prove to be relatively harmless. Thus we find that calcareous deposits do not invariably produce periclasia. Bacteria are present in every mouth, and yet the most neglected mouths may show a healthy periodontium. Even traumatic occlusion may occasionally be seen in mouths which show evidence of disease. But let us combine calculus, bacteria, traumatic occlusion and lowered tissue vitality, and we invariably produce a suppurative pericementoclasia.

These etiological factors may be arranged in six groups as follows:

1. Malocclusion.
2. Defective operative and prosthetic procedures.
3. Trauma.
4. Abnormality of tooth surface.
5. Abnormal system conditions.
6. Parasitic invasion.

The first four are called primary or inaugurating factors, while the fifth and sixth are secondary and non-inaugurating.

There is, as previously mentioned, a disposition on the part of periodontists to consider the purely local factors as the most important, or, in other words, the determining factors, while systemic conditions and bacteria are assigned a secondary role in bringing about the inception of periodontoclasia. One authority in a recent paper states, that periodontal disease is purely a bacterial proposition; that to eliminate periclasia it is only necessary to eliminate bacteria. Careful examination of the two viewpoints shows them to be far from irreconcilable, especially when we stop to analyze the means of prevention.

I believe that it is more rational to give the etiological place of prominence to the factors which pave the way for bacterial invasion, and not to the bacteria themselves.

In the final analysis nature must fight off micro-organisms by her own strength. We can never keep the mouth free from bacteria for any length of time, and when they have gained a foothold in the tissues we can never by methods of sterilization destroy quite all of them—Nature must finish what we begin. Moreover, we find that when we have perfectly removed the irritants, which I believe should be called primary factors, the protective forces of the blood will, in most cases, put the bacterial army to rout with little or no assistance in the way of artificial disinfecting agencies. So, while it is absolutely accurate to say that bacteria are responsible for pus formation and tissue destruction, be sure to keep your perspective undistorted; remember your fundamentals in etiology are malocclusion, operative shortcomings, abnormal tooth surface and trauma, and the bacteria and physical ailments, while important, are usually secondary in their relation to other factors.

The pathology of the various types of dental periclasia shows variations, as is to be expected in disease conditions exhibiting such striking diversities. We must bear in mind, of course, that these types are seldom found in a pure or uncombined state; it is much more common to find two or more types blended, and with lines of demarcation so indistinct as to furnish ample excuse for the jumble of opinions advanced in the past. In the same way we find a blending and intermingling of the pathology of the various types.

The health of the periodontium, depends first of all on the normal blood supply, both in the amount brought to and carried away from the part, in the proportions of nutrient and protective elements of the blood itself; and also on a normal lymphatic circulation. The tissue cells, too, must be in a condition which will lead them to assimilate the nourishment brought to them; for a while we can lead a cell to the blood stream, we cannot make it drink. This condition depends partly on tonicity, partly on nerve reflexes. The next in our item of health foundations is normal occlusion, normal not only as the orthodontist sees it on his articulated models but coordinated in its antagonization, no matter what the manner of closing or moving the jaws in mastication. Then comes the smooth clean tooth surface, which can only be maintained by the friction of food well chewed, or by the vigorously wielded tooth brush. These are your fundamentals of the healthy mouth; namely: normal blood supply, normal occlusion and cleanliness. Pathogenic agencies can gain no foothold in the mouth where these conditions prevail.

Diagnosis is the guide-post to treatment. Without intelligent differentation of types of disease, and detection of the factors responsible for their occurrence, we are reduced to the treatment of symptoms rather than treatment of the disease itself; a decidedly empirical proceeding and one that is likely to be unsatisfactory to all concerned. The first step in diagnosis is the examination of the case, the recording of conditions found and their etiology.

The important role that saliva plays in these peridontal diseases is worthy of much consideration. Normal saliva assists greatly in maintaining a healthy condition in the oral cavity. Abnormal reactions of the saliva can frequently be traced to the excessive use of free sugar in the diet.

References—

Fundamentals of Periodontology, By JOHN OPPIE MCCALL, D.D.S., Buffalo, N. Y.

Dr. Geo. S. Staples, of Sherman, spoke highly of the papers read upon pyorrhea and complimented the authors for their painstaking efforts, but said, that having devoted very much time and consideration during his many years of practice to the study of pyorrhea, its cause and treatment, he felt justified in asserting his opposition to the much advocated and practiced plan of treating pyorrhea by planing the roots of the teeth affected.

DR. W. O. Talbot, of Fort Worth, discussed points in all the papers of the Symposium. He stated that such a thorough presentation before the Society of this most important subject had never before been attempted; which he attributed largely to inspiration derived from the recent post-graduate work of the Society. He regarded this interest among our leading men with a great deal of satisfaction, as it was directed towards the most important service of prevention of maladies, which, if neglected, destroy the teeth of mankind.

DR. Russell Markwell, of Galveston, could not see that much real progress had been made in the treatment of pyorrhea since he entered practice. He reviewed the many "cures" which had come and gone during that period, not forgetting emetin and expressed the opinion that success in the treatment of pyorrhea was in its infancy.

DISCUSSION OF DR. J. S. MCMINN'S PAPER

DR. W. P. DELAFIELD, Dallas, Texas: In taking up the discussion of Dr. McMinn's paper, I wish to compliment him in two ways.

First. In preparing a paper to read before this body relating to pyorrhea; for the reason that a great percentage of dentists, unless they are specially interested in this work, pass it up—or, to descend to colloquialism—"pass the buck."

Second. Dr. McMinn shows that he has given this subject deep study and as a result has presented us with a splendid paper.

Dr. McMinn states, there has been more time spent in vain and different methods of treatment for pyorrhea than any other dental ailment, and this, perhaps is true and perhaps will always be true as long as the dental profession goes off half-cocked after every cure-all that is placed on the market. You remember a few years ago, every drug store had a form of ipecac advertised in their show windows, claiming a cure for this. I do not know the cause for this state of affairs unless it is that the foundation condition has been neglected. I mean by this statement that instruction in the dental schools has not given the proper time and attention to this work. Dental students do not, as a rule, like this work, which is very unfortunate.

I am afraid there is quite a percentage of dentists that cannot discuss the cause of this condition we call pyorrhea, with their patients, and, as the essayist has said, it is essential that we know. It is my belief that it is simply a local condition. Now, I do not deny that the general systemic condition of the patient has an influence and should be looked after, but I think this is only a predisposing factor, or complication, of the pyorrhea. Personally I believe that if the mouth is looked after and the proper prophylaxis done, with the absence of local causes, no systemic disorder would produce a case of alveolar pyorrhea. I mean by this, there is no systemic reason for the cause of pyorrhea other than those that may predispose to any other disease.

At this point I want to digress for the purpose of stressing the importance of this disease. Almost every day a patient will say to me: "I have been going every few months to Dr. ———— and he has never said anything about this condition into which I have drifted." That is the solution, in my mind, to the whole thing, for it is more satisfactory to prevent than cure.

The essayist has brought out the point well in regard to removing the deposits around the teeth, and I will add to what he said—removing anything or correcting any thing that will be a drawback to a successful prognosis. Don't hesitate to extract and don't try to do the impossible, viz., try to save teeth that it is an impossibility to save.

Instrumentation is the all-important factor in getting results in our treatment of pyorrhea, but I do not agree with the essayist in his treatment. He states that he goes around the teeth at each sitting, but I think it is much better to take one tooth at a time and not leave it until you are satisfied there is nothing left that will retard or hinder our success. Have a definite starting point and work around the teeth. With the proper instruments and careful technic, there is no reason for injury to tissues or tooth structure.

Root planing has been practiced since dentistry was a profession, but few have achieved that degree of skill who could, by the sense of touch, remove all the deposits and this porous coat from the dense surface of the cementum.

After the scaling is finished, in some cases, I use a small bone curette to remove the sharp edges, or corners, of alveolus and disintegrated bone. Exercise care and a delicate sense of touch in using a curette in pyorrhea work.

In the electric cautery, we have a very valuable instrument, but I do not altogether agree with the essayist in its use. In fact, I find more cases in which I do not think that it is indicated, than otherwise. Again, it is difficult to use around tooth-roots without giving the patient pain. In a great per cent. of cases, Nature will get rid of the pockets if given an opportunity without the use of the cautery or lancet, and not leave scar tissue to deal with. With the use of Conductive Anesthesia, or nerve blocking, we can use scissors and lancet where it is necessary with more skill than the cautery. At least, that has been my experience.

There is no doubt but the cautery has its place in the office of the Periodontist, but it has not been the success with me that essayist claims.

A dentist should be thoughtful and scientific in all his work, using skillfuly those things wherewith he gets the best results.

Dr. McMinn has given us a good paper and I have enjoyed its reading and discussion.

DISCUSSION OF DR. MENGEL'S PAPER

Dr. W. M. Brown, San Antonio, Texas: On reading the title of Dr. Mengel's paper, I am profoundly impressed with its fundamental importance, and its relative value to other factors in diagnosing gum infection. True, every pathological condition should be observed, and relatively considered, in every proper diagnosis, but the frail, delicate septal tissue is one of the first places to show pathological changes in disease of the gums.

As the doctor has stated, gingivitis is only the initial stage of pyorrhea, hence the vital importance of an early observance of gingivitis that it may not develop into pyorrhea. The situation, shape and structure of the septal gingiva, renders it peculiarly susceptible to trauma and infection, and the ruthless destruction of this provision in nature's economy, either by disease or the surgeon's knife or cautery, is an unfortunate thing to consider.

In my experience the pathological conditions to be first observed, in most cases, is a slight redness, gradually developing into a deep crimson, then a slight soreness, and hemorrhage from applying pressure, followed later by sloughing and utter destruction of the septal tissue. In some instances pressure from food, toothpick, or other sources have gradually reduced this septal wedge of gum until it is entirely obliterated and seemingly no pathological condition has existed. Nevertheless, this condition is to be deeply regretted for this septum is important to the health and integrity of both teeth and gums; for in many instances a depression, then pyorrhea pockets are formed, and while it is possible for these pockets to be healed, I have yet to see a case where the septum has been reproduced. No dentist should remove this septum, except in extreme cases and then only as a last resort, for its function is of unquestionable value.

I desire to emphasize the statement Dr. Mengel has made with reference to the poor quality of operative dentistry, for here is where the general practitioner can prevent much mouth infection. No restoration of any nature whatever that will constantly irritate the soft tissues should be placed in the mouth. I am firmly convinced that many well developed cases of pyorrhea, with the subsequent loss of both gum tissue and teeth, started with a slight irritation in the septal gingiva caused by an improperly-adapted clasp, an improperly-constructed, fitted and articulated crown, or an improperly-inserted and finished filling. Hence, "The Importance of observing the Septal Gingiva in Early Diagnosis of Diseased Gums."

Dr. Trim Houston, of Corsicana, discussed generally the papers read, but was especially impressed with the paper of Dr. Mengel, calling attention to the importance of observing the septal gingiva in diagnosing disease of the gums. Because of his years of connection with the State Orphans home at Corsicana, he had much experience with children and has learned, even with them, to attach importance to the slightest irritation of the septal gingiva. He believes that Dr. Mengel, even in the unusual title of his paper, has done a valuable service, and his paper will undoubtedly suggest to many the significance which may be attached to these slight irritations.

Dr. Riggs, in closing, made a good discussion, making his points clear as well as impressing every one with his command of the subject, especially the pathology of it.

Dr. Robertson, in closing, made an earnest appeal for more profound study of this most important phase of practice, especially as taught by such men as Hartzell; expressing the assurance that such a course, with strict attention to this celebrated man's operative technic and his measures for prophylaxis, will enable any dentist to successfully combat all but the worst cases of pyorrhea.

Dr. Snowden, in closing, emphasized the importance of limitless perserverance in teaching one's patients how to care for their own teeth, recommending among other measures, their use of pumice stone as an accessory to the usual dentifrice.

Dr. McMinn, in closing, recommended as a substitute for powdered pumice stone the use of finely-powdered silex, and urged as the greatest factor in the treatment of pyorrhea, its prevention by prophylactic measures, a thing perfectly possible of accomplishment by the perfect cooperation of the dentist and his patient.

FUNDAMENTALS OF OPERATIVE DENTISTRY

BY W. H. O. McGEHEE, M.D., D.D.S., CLEVELAND, OHIO

LATE PROFESSOR OF OPERATIVE DENTISTRY, DENTAL PATHOLOGY AND THERAPEUTICS, AND SUPERINTENDENT OF CLINICS IN THE DENTAL SCHOOL OF WESTERN RESERVE UNIVERSITY.

THE CARE OF CHILDREN'S TEETH.

THE MANAGEMENT of children in the dental office is quite largely a psychological problem. Many dentists, although possessing great skill in dealing with cases daily arising in routine dental practice, do not possess the qualifications necessary to successfully cope with the many difficulties involved in handling children. Owing to frequent natural timidity and restlessness on the part of these little patients, the small size of the oral cavity, and the increased amount of salivary secretion usually present, the problems involved are manifold. It is with patients of this type that women dentists are often better adapted by nature than men to cope successfully with the situation. However, it is true that a firm manner, usually supposed to be predominant in the male sex, occasionally will be necessary in handling certain types of children, although the opposite attitude of kindliness and sympathy frequently will produce the desired effect with many of them.

The necessary qualifications on the part of the dentist for successfully administering to the dental needs of children are tact, knowledge of human nature, patience, extreme kindness, sympathy, firmness and willpower when necessary, operative skill, and judgment in the selection of the materials and remedies used. Every child should be studied closely, and the method of handling adapted to its individual needs and characteristics. Each case must be handled differently, and a decision must be reached quickly as to what attitude to adopt. Often, children have had a dread of the dentist instilled into them at home. Parents should be strongly cautioned against this.

Many dentists do not fully appreciate the importance of the proper care of children's teeth, and many others, unfortunately, knowingly minimize its importance, because of their dread of handling cases of this nature, with the result that, frequently, untold injury is done these little patients through neglect or carelessness. If the child is carefully studied and properly handled, he often will submit willingly to operations to which the adult patient will subject himself with poor grace. It should be remembered that these little men and women are soon to become the representative citizens of the community, and that they deserve all the care and skill of which the dentist is capable.

At the first visit to the operating room the little patient often is filled with curiosity, timidity, or is markedly anticipative of dreadful consequences. It is highly important that this first experience should be made as pleasant and free from pain as possible, else disastrous consequences may result, and it be impossible to induce him to submit to further procedures. The following rules usually may be adopted by the dentist at this first visit with beneficial results:

First, no difficult or painful operation should be attempted, unless absolutely necessary.

Second, if relief from pain is demanded, apply a simple, palliative treatment to the tooth. This occasionally may be done with the child seated in the lap of the mother or nurse.

Third, endeavor to become acquainted with and gain the confidence of the patient.

Fourth, avoid deceiving the child, or concealing instruments.

Fifth, if application of medicaments is necessary, use those which are least disagreeable in taste and odor.

Sixth, entertain the child with pleasant conversation, and attempt to interest it in pictures, the chair, or surrounding objects.

Definite and careful instructions should be given parents in regard to the care of the teeth of their offspring. Every effort should be made to impress them with the importance of constant surveillance in regard to daily cleansing, regular and frequent visits to the dentist, care of the temporary denture, and especially of the necessity for preservation of the first permanent molar.

Regular and systematic cleansing of the mouth should be begun soon after birth, before the eruption of the teeth. The mouth should be swabbed by the mother or nurse with a solution of boric acid, milk of magnesia, or formolid-magnesia, by means of a sterile cloth, napkin, or absorbent cotton, wrapped around the finger or an orange-wood stick. Redoubled care should be instituted as soon as the teeth begin to appear, using the same method, or a small, fine bristle brush. A mucilage brush, or the smallest size child's brush, from which some of the bristles have been cut, may be utilized in the beginning. Floss silk also should be passed carefully between the teeth. As soon as the child is old enough, it should be taught to cleanse its own mouth, and told why it is necessary to do so. Dentifrices should be of a pleasant taste. Stimulation of fear of the dentist should be avoided. If candies and other sweets are desired, they may be used without harm, provided they are not eaten to excess, and the mouth is cleansed after eating.

589. Describe the *Position* of the child and operator for *Lancing the Gums*.

First, Upper Teeth. Lay the child on a pillow across the nurse's lap. Place its head on or between the operator's knees, insert one or more fingers of the left hand into the mouth and obtain a proper guard by placing the thumb on one side and the forefinger on the other side of the alveolar process.

Second, Lower Teeth. Seat the child in the lap of the operator, with its head against his breast. Pass the left hand around the infant's head, insert the left thumb into the mouth, with the fingers under the chin, thus steadying the jaw.

590. Describe the *Operation of Lancing the Gums.*

With a sharp bistoury, around the blade of which (except at its point) floss silk or tape is wrapped, to prevent accident incident to struggling of the patient, make one or more incisions till the crown of the tooth is freed of the overlying gum tissue. For the upper incisors, make a lineal incision slightly to the labial side of the cutting edge; for the lower incisors a similar incision slightly to the lingual side. The same procedure is followed with the cuspids, unless the point is protruding, in which case a crucial incision is indicated. For the molars, a crucial or X-shaped incision accomplishes the desired result. In cases of partial eruption small bands of gum tissue may best be removed with sharp-pointed curved scissors. (*Fig. 323*). Aseptic precautions should be observed.

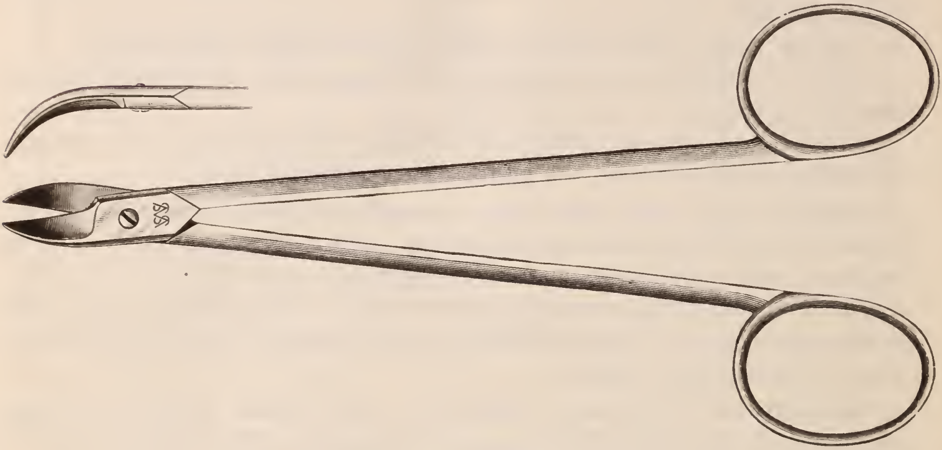

Fig. 323—Curved gum scissors.

591. What should be the *Length of Time of a Sitting* for dental operations on children?

As a rule, the operation should not exceed thirty minutes at the most, better much shorter, for a child under twelve years of age; while one hour should, if possible, be the limit for patients between that age and eighteen years.

592. Give three *Reasons for Preservation* of the temporary teeth.

First, to prevent bad habits of mastication, with their evil consequences.

Second, to assist in the growth of the jaw.

Third, to avoid irregularities of the teeth.

593. What *Substances* are valuable for *Odontalgia* and for *Temporary Dressings* in children's teeth?

A Fletcher's carbolized resin, the formula for which is:

Phenol	ʒI
Resin (colophony)	ʒI
Chloroform	℥ss

Misce.

B Oil of cloves.
C Eugenol.
D Campho-phenique.

594. Describe five *Methods of Applying Silver Nitrate* in the treatment of caries.

It often is necessary to leave a layer of partially decalcified dentin on the walls of cavities in children's teeth, to avoid unnecessary pain, as well as exposure of the pulp. In these cases, silver nitrate may be applied as a desensitizing and sterilizing agent with advantage. The methods of application are as follows:

First, touch a solution of silver nitrate, forty per cent. to the dried surface with a pointed orange-wood stick.

Second, saturate blotting paper or asbestos felt, preferably the latter, with the solution, place in position and fill the cavity.

Third, carry crystals of silver nitrate to place with heated gutta-percha, filling the cavity with the latter substance.

Fourth, dip a silver wire in nitric acid, and touch to the walls of the cavity, thus depositing silver nitrate in the area of decay.

Fifth, touch the affected surface with a stick of lunar caustic. Whatever method is used will likely cause discoloration of tooth structure, which should be avoided on permanent anterior teeth.

595. What *Important Anatomical Condition* should be remembered in the excavation of cavities in deciduous and recently-erupted permanent teeth?

The large size of the pulp and its proximity to the surface with consequent danger of exposure. The location of the recessional lines of the horns of the pulp also should be borne in mind.

596. What *Filling Materials* are indicated in the Deciduous Teeth?

Oxyphosphate of zinc and copper cement, gutta-percha and amalgam. Most operations in these teeth, owing to the age of the patient, small size of the mouth, necessity for imperfect cavity preparation and other procedures, as well as the difficulty of maintaining dryness, can be of a temporary nature only, and parents should be informed of this fact.

597. What is the *Danger of Interproximal Gutta-Percha Fillings,* bridged across two adjoining cavities, and how may it be avoided?

Injury to the gum tissue, from packing of the material against it during its insertion, or from the force of mastication. This may be avoided by the use of metal space guards, or concavo-convex discs, prepared by the operator from gold, platinum or German silver, coated on their under surface with gutta-percha and adapted to the gingival walls of the two cavities, thus bridging across the space, after which the filling may be inserted *en masse.* Cement or amalgam never should be used in this manner.

598. Name the *Advantages and Disadvantages* of gutta-percha as a filling material for temporary teeth.

Advantages:

A Ease and rapidity of introduction and finishing. (Dryness of the field of operation is not absolutely essential, though desirable).

B Insolubility.

C Durability, unless exposed to wear.

D Non-conductivity.

E Tendency to produce separation and stimulate growth of the jaws.

Disadvantages:

A Lack of durability, if exposed to the forces of mastication.

B Tendency to spread and injure the gum, unless watched.

599. Name the *Advantages and Disadvantages of Oxyphosphate of Zinc Cement* for filling Temporary Teeth?

Advantages:

A Non-conductivity (partial).

B Edge strength (better than gutta-percha).

C Adhesiveness.

D Ease of introduction.

E Harmonious color.

Disadvantages:

A Absolute dryness a necessity.

B Solubility.

C Irritating tendencies, if in too close proximity to the pulp.

600. Name the *Advantages and Disadvantages of Copper Cement* in temporary teeth.

The advantages and disadvantages are practically the same as those given in the preceding answer, except that it possesses the additional advantage of being a preservative of tooth structure, owing to its antiseptic properties; and another disadvantage of being black in color, unless some of the recently introduced light copper cements are used.

601. Under what circumstances may *Amalgam* be used in Temporary Teeth?

Whenever ideal cavity preparation may be obtained, its color will not be objectionable, dryness may be maintained for a sufficient length of time for its introduction, proper contours may be accomplished, and proximity of the pulp is not prohibitive. Under these conditions it is the more lasting material. It should, however, never be bridged across two adjoining cavities.

602. Should the *Rubber Dam* be used on Children's Teeth?

Many timid children will rebel against its use, and in these cases its application should not be attempted. It will, however, be found on trial that most young patients will submit to it without trouble, and often will prefer it to absorbents. When used, most of the excavation should be completed before its application, in order not to tire very young patients. Clamps should be avoided in most instances, depending on the use of ligatures where necessary.

603. What *Materials* may be used for filling the *Permanent Teeth* of Children?

Every case will be a law unto itself and will have to be handled with good judgment. As a general rule, cement for the anterior teeth and amalgam for the posterior ones are indicated, until the child reaches an age where the roots of the teeth are fully formed, and where physical and mental development will allow gold building operations. Inlay work occasionally may be resorted to in badly broken-down cases, even in quite young patients.

604. What *Agents* are used to *Devitalize* pulps of Deciduous Teeth?

Phenol, creosote, tincture of iodin, and ammonia are the drugs most frequently recommended. There is quite a difference of opinion in regard to the use of arsenic trioxid, some authorities decrying its use, while others recommend it. If used at all, it should be avoided in cases where absorption of the roots has progressed to any extent. This should be determined by the X-ray. It also should be used in very small amounts, and the time of its action limited to from twelve to twenty-four hours, depending on circumstances.

605. What *Materials* are used to *Fill Root Canals* in Deciduous Teeth?

Materials which will be absorbed with the root, such as:

A Salol. Liquify by heat and pump into the canals with a warm smooth broach.

B Salol and aristol, equal parts; used in the same manner.

C Salol, aristol and paraffin, using the same method.

D Paraffin, melted and pumped into the canals.

E Prinz' root-canal filling material.

F Zinc oxid, or calcium oxid made into a paste with oil of cloves, eugenol, or formocresol.

G Euca-percha (Buckley).

606. What is the *Treatment for Alveolar Abscess* in temporary teeth?

Practically the same as for permanent teeth, as far as conditions permit. If the tooth is very sore, the passage of a broach into the canals, after flushing out the cavity, often will afford exit for malodorous gases and other products of putrefactive decomposition, and relieve the acute symptoms. Lancing of the gum is practiced under the same circumstances as indicated for permanent teeth, and often affords quick relief from pain. As soon as conditions will allow, the chamber and canals may be opened and the usual treatments applied, these cases often responding much more readily than permanent teeth.

607. Describe *Buckley's Treatment* for putrescent pulps and abscesses in deciduous teeth.

First, rinse the mouth with an antiseptic solution of pleasant taste.

Second, open the pulp chamber and remove its contents, again syringing with the antiseptic.

Third, fill the chamber, after drying, with a paste of calcium phosphate and formocresol.

Fourth, fill the cavity with cement or cement and amalgam. Dr. Buckley claims that healing occurs and no after-effects ensue, unless caries or necrosis of bone is present, under which circumstances the treatment is contraindicated.

The period of dentition is sometimes a trying one for both mother and offspring. Some children pass through this period with very little trouble, while others become subject to morbid local inflammatory and septic disturbances of the gum over the erupting tooth, as well as grave systemic manifestations of a reflex nature. A description of these disturbances usually is confined to works on pathology, and will not be entered into here. However, it may be said that they are largely the result of pressure on the overlying gum or on the dentinal papilla and pulp at the end of the forming root. Quick relief frequently is afforded by the operation of lancing the gum and the local application of antiseptic washes. The graver constitutional manifestations usually fall into the hands of the physician.

The following table of Stellwagen (Coleman's Dental Surgery), gives the average periods of eruption of the deciduous or temporary teeth:

Group 1—Lower central incisors. Time of eruption, 7 months. Duration of eruption, 1 to 10 days. Interval, 2 to 3 months.

Group 2—Upper central and lateral incisors. Time of eruption, 9 months. Duration of eruption, 4 to 6 weeks. Interval, 2 months.

Group 3—Lower lateral incisors. Time of eruption, 12 months.

Group 4—First molars. Time of eruption, 14 months. Duration of eruption, 1 to 2 months. Interval, 4 to 5 months.

Group 5—Cuspids. Time of eruption, 18 months. Duration of eruption, 2 to 3 months. Interval, 3 to 5 months.

Group 6—Second molars. Time of eruption, 26 months. Duration of eruption, 3 to 5 months.

In the United States the eruption of the lower lateral incisors usually precedes that of the upper, and the average periods for all of the teeth are frequently slightly earlier. Special care should be observed during this period in regard to cleanliness, proper clothing and diet. Children at this age seem to be particularly subject to intestinal disturbances.

The following table from Buchard gives the average period of eruption of the permanent teeth:

First molars	5½ to 7 years
Central incisors	7 to 8 years
Lateral incisors	8 to 9 years
First bicuspids	10 to 11 years
Second bicuspids	11 to 12 years
Cuspids, the lower usually preceding by a year or more	12 to 14 years
Second molars	12 to 15 years
Third molars	16 to 20 years and indefinitely beyond

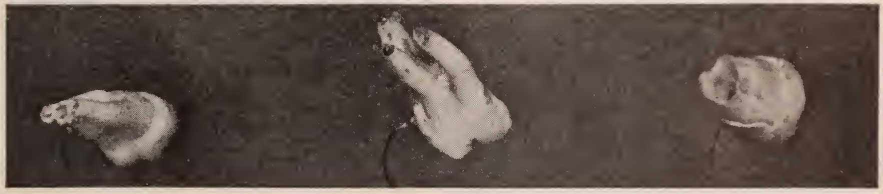

Fig. 325—Incomplete development of the roots of a first, second and third molar.

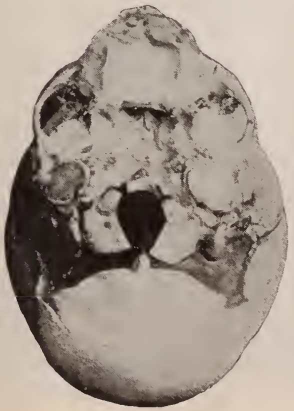

Fig. 326

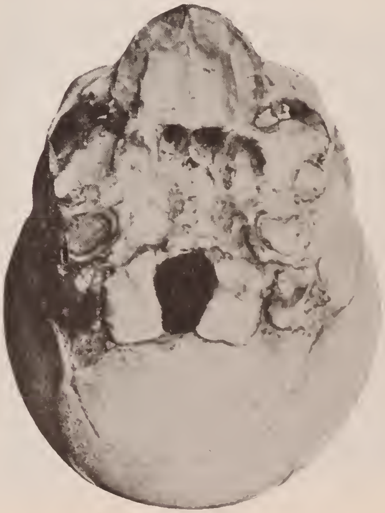

Fig. 327

Fig. 326—Skull of a fœtus. Evidences of the crypts for the temporary tooth follicles may be seen.

Fig. 327—Skull of a fœtus.

It usually requires about three and one-half years for resorption of the roots of the temporary teeth, and the same period for formation of the roots of the permanent ones. The time required varies with the

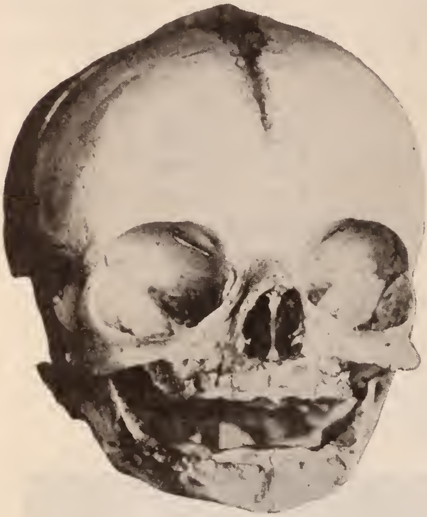

Fig. 328

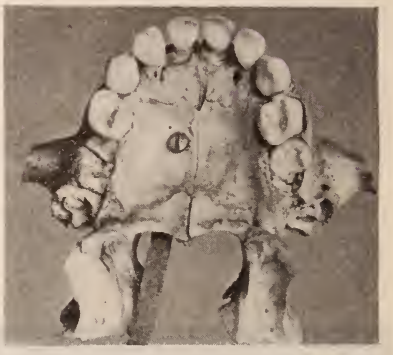

Fig. 329

Fig. 328—Skull of an infant at birth. The follicles for the deciduous teeth are seen

Fig. 329—Maxilla at about two years of age, showing the deciduous teeth. The second molar on the left side has just broken through the bone.

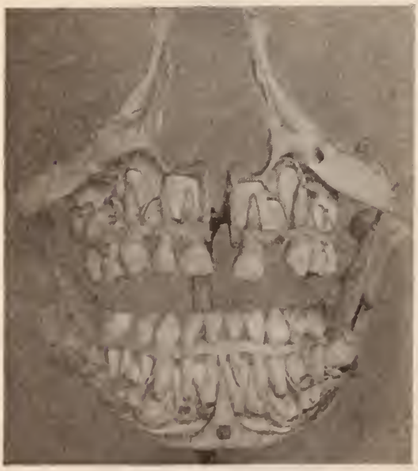

Fig. 330

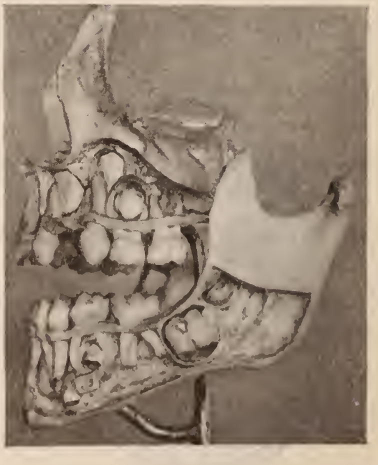

Fig. 331

Fig. 330—Maxilla and mandible at about five years of age. The developing permanent crowns are seen to the lingual side of the roots of the deciduous teeth.

Fig. 331—Maxilla and mandible at about five and one-half years. Note developing crowns of first and second permanent molars in lower jaw.

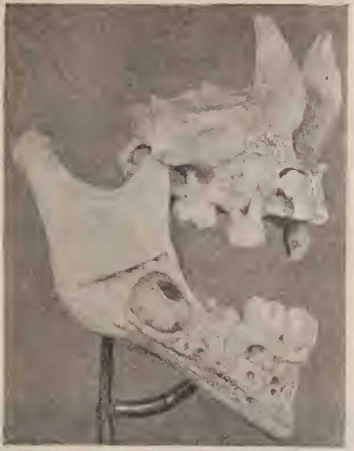

Fig. 332

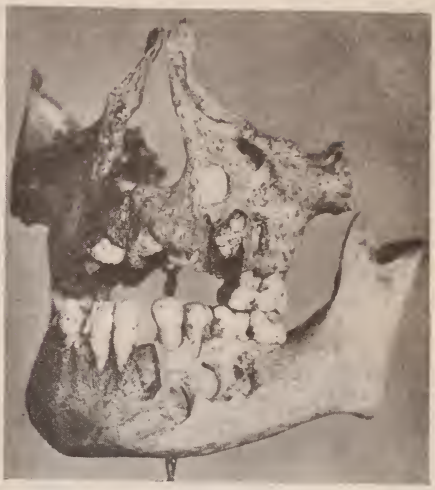

Fig. 333

Fig. 332—Upper and lower jaw at about six years.

Fig. 333—Showing jaws at about seven years. The lower permanent centrals and the upper and lower first permanent molars are in position.

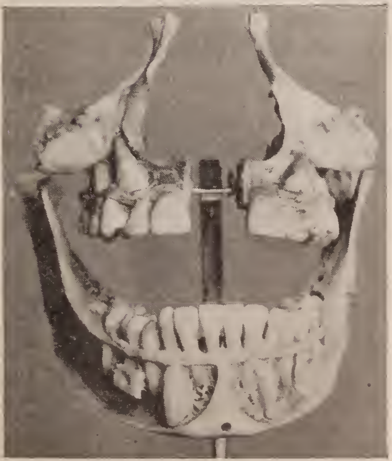

Fig. 334

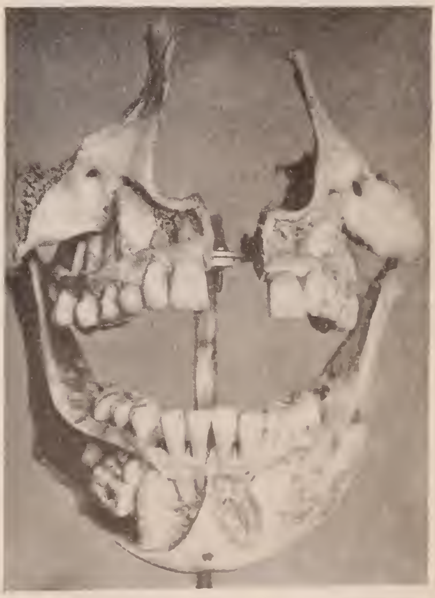

Fig. 335

Fig. 334—Maxilla and mandible at about ten years of age.

Fig. 335—Maxilla and mandible at about ten years. The permanent centrals, laterals and first molars are in position.

different teeth, but if the average time, as stated, is remembered, it will be of value in its bearing on the performance of root-canal operations in the mouths of children. (*Fig. 325*). However, the X-ray frequently should be resorted to in arriving at a decision. Reference to *Figs. 326 to 337 inclusive* will indicate the state of development of the temporary and permanent teeth at different periods. Usually the eruption of the permanent teeth is attended with very little disturbance, although the second, and more often the third molars are occasionally quite troublesome, their eruption being sometimes accompanied with marked local inflammation and reflex manifestations.

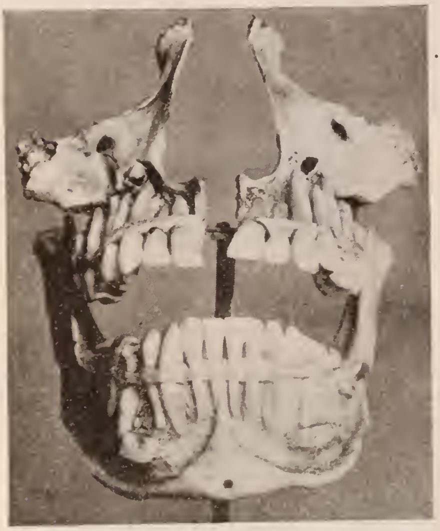

Fig. 336

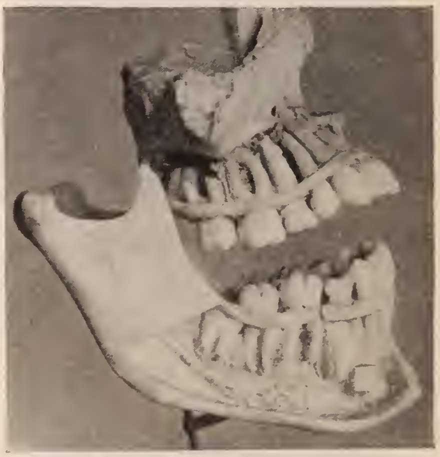

Fig. 337

Fig. 336—Showing the conditions present at about fifteen years. Many of the roots are fully formed.

Fig. 337—Maxilla and mandible at about fifteen years. The lower third molar with undeveloped apical third of the roots is seen forcing its way through the bone. The second bicuspid is delayed in eruption with its temporary predecessor still in position in both jaws.

REPORT OF THE COMMITTEE ON DENTAL SCIENCE AND LITERATURE

CALIFORNIA STATE DENTAL ASSOCIATION

DR. F. V. SIMONTON, SEC.

(FOR THE DENTAL SUMMARY)

THE POSSIBILITIES OF THE CALLAHAN METHOD

By Harry B. Johnston, D.D.S.

"Journal of the National Dental Association," February, 1921.
Abstracted by Chas. Zappettini, D.D.S., San Francisco, Cal.

WITH THE CALLAHAN METHOD of root-canal filling, it is not only possible but easy to fill and hermetically seal canals. Briefly stated, the Callahan method consists in the use of dilute sulphuric acid as a decalcifying medium to assist in opening the canals followed by a saturated solution of sodium bicarbonate, causing rapid effervescence, which clears out the debris.

After dehydration the canal is flooded with a solution of chloroform and fiddle-bow resin. The proportion is twelve grains of resin to three fluid drams of chloroform.

A pure gutta-percha point slightly smaller but longer than the canal is passed into the canal and caused to dissolve in the chloroform by a rapid, delicate pumping or stirring motion.

Taken step by step: Sulphuric acid as a clearing agent. From 30 to 50 per cent. aqueous solution of chemically pure acid is used. It softens the walls by decalcification. It can be sealed in the canals and allowed to work by diffusion through small accessory canals. The sulphuric acid attacks the organic matter in the canals, causing it to yield up its water, thereby shrinking and releasing its hold on the wall. The soda now will remove the organic matter from the canals by effervescence.

In the small canals, it will not remove the organic matter, but it can be forced out into the tissue and there digested, and the remainder in the canal be encapsulated by the filling. No acid will go through the apex unless careless broaching will force it there.

Technic and Instrumentation—Free the canal of pulp tissue or old filling; coat the tooth with a varnish or cholro-resin. Flood the pulp chamber with 50 per cent. acid and enter canal with fine or extra fine pulp canal file. Acid is pumped in as the filing is done. Never go through opening of apex if possible.

The acid is neutralized frequently to help remove the debris. Fresh acid can be placed in the canal, the excess absorbed, and the patient dismissed after sealing the pulp chamber with hot temporary stopping without pressure. The acid is self-limiting.

If the canal is not straight, examine radiogram and bend your fine file or broach in that direction and persuade your canal, but never use force. Capillary attraction has practically nothing to do with acid penetrating the small canals.

Filling the Canaliculi by Diffusion—When the acid is used for the last time and it has been neutralized, the canaliculi are filled with water. Chloro-resin will not enter where water is. Alcohol is, therefore, substituted for the water as it has a great affinity for cholroform. The main canal is flooded with 95 per cent. alcohol and allowed to stay three to five minutes. By diffusion, this substitutes for the water in the canaliculi, leaving about 85 per cent. alcohol in them. Remove all excess alcohol with points in main canal and flood canal with chloro-resin. Use no pulp canal driers or hot air. The chloroform diffuses perfectly into the alcohol and since the resin is in solution with the chloroform it will follow the resin. Allow from three to five minutes, again pumping in fresh chloro-resin and as the chloroform evaporates or is taken up add pure choloroform to keep the solution thin. Then pass the gutta-percha point in either by pumping or rotating. Pumping motion for a small canal and rotating for a large canal. A plugger of suitable size can be passed down through the center of the filled canal, half way to break up all central cohesion. Fill the pulp chamber immediately with cement to allow no more external evaporation of chloroform.

EDITORIAL

DENTAL NOMENCLATURE

At least there is promise of something being done to standardize dental nomenclature. For years but little attention has been given to the subject by the profession with the result that many of the old terms still used are inadequate and new terms have become so numerous as in many instances to be confusing.

Our present terminology no longer meets the full demands of writers and speakers. There is need of a revision and standardization of dental nomenclature.

At the organization of the Dental Editors' Club of America in Boston last year, during the session of the National Dental Association, it was suggested that a committee on dental nomenclature be appointed and that the committee make a report at the next meeting to be held in Milwaukee at the time of the National Association in Aug., 1921.

Dr. L. Pierce Anthony, of the *Dental Cosmos*, Chairman of the Committee, made a report. He called attention to the fact that the development of the science and art of dentistry is going forward with such rapid strides that our present terminology no longer meets the demands of writers who endeavor to convey in a clear and understandable manner the result of their efforts. He said: "The varied operations and methods of procedure in dental practice demand a nomenclature capable of expressing the refinement and differentiation of meanings peculiar to dentistry, which can be supplied only by an ample and discriminating technical terminology and our present dental nomenclature falls far short of such requirements." He pointed out how individual efforts alone had brought in many instances a multiplicity of terms that are used to convey the same meaning. For instance: X-ray, radiograph, raiogram, skiagraph, skiagram, roentgenogram, roentgenograph, shadowgraph, shadowgram. This multiplicity of terms is contributory to confusion of words to indicate the same thing. He thought it much better if these terms be limited and *Radiograph* used to indicate the X-ray process and also as a verb—*Radiogram* the product of the process, and *X-ray* to indicate the process but not used as a verb.

Acting in accord with a resolution from the Dental Editors' Club, The National Dental Association appointed a Committee on Nomenclature which committee will be the final arbiters under the direction of the National Association with regard to matters relating to Dental

Nomenclature. It is the purpose of this committee to make a definite advance toward standardizing of dental nomenclature. The personnel of the committee is: Chairman, L. Pierce Anthony, Philadelphia; C. N. Johnson, Chicago; O. U. King, Chicago; H. E. Friesell, Pittsburgh; H. L. Wheeler, New York.

YULETIDE GREETINGS

The editor and publishers join in wishing all of
our readers a Merry Christmas and a
Prosperous and Happy
New Year

SUGGESTIONS

Conducted by F. R. Chapman, M.S., D.D.S., Columbus, Ohio

(To Our Readers: Give others the benefit of your practical suggestions by sending a description of them to Dr. F. R. Chapman, Schultz Building, Columbus, Ohio.)

To Disinfect and Desensitize Gums before Injecting

Iodin crystals	Gm. j
Menthol crystals	Gm. i j
Benzole	Gm. xxx

Make solution in three ounce bottle; it will fill bottle about two-thirds. Use a small amount in a butter dish or one of Colgate's receptacles for each patient. Do not stick swab in bottle or you will contaminate the solution.—*T. H. Herrity, Clinton, Iowa.*

The Sprue

Some of you fix the sprue in the impression while still in the cavity. Instead of heating it and at once placing it in the wax impression, just try heating it to redness, and first putting the point into sticky wax. The stickfast effect of the sprue to the wax model is most noticeable.—*W. Stewart Ziele, Dental Science Journal of Australia.*

Painless Removal of Pulp

A combination of one-eighth gr. of cocaine and one drop of carbolic acid applied to the pulp will, after five minutes, enable one to remove it perfectly painlessly.—"*Oral Health.*"

Acid Pot for Laboratory

A heavy and inexpensive ink well fitted with a glass or other suitable acid-proof cover makes an excellent acid container for the laboratory. It cannot be easily upset.—*R. L. Newling, Hettinger's Dental News.*

Painless Removal of Enamel

Place a short piece of rubber tubing or small rubber band around the neck of the tooth well up on the gum and leave it over night so that the gum will be pressed back. The enamel may then be removed quite painlessly without causing the gum to bleed.

—*H. Hartman, Dominion Dental Journal.*

To Prevent 95% of Phenol from Crystallizing

Instead of warming the phenol add a few drops of denatured alcohol and you will find that it will remain solvent no matter what the temperature of the room may register.—*William V. Sher, Dental Facts.*

Before Investing Inlay

When the wax model for a gold inlay has been trimmed to correct form and the surface has been carefully gone over with a very small quantity of oil of cajeput, wash off carefully and go over with liquid soap and water. Besides giving a beautiful finish to this wax, it will be found that the investment can be painted on the wax much more readily.—*E. S. Best, Dental Facts.*

Capping Material Where the Pulp is Almost Exposed

Take equal parts of zinc oxid and thymol and melt together in a spoon. When cold, it sets hard. Break into small pieces, and place in an airtight bottle. To use, place a small piece over or in the deep part of the cavity, and just touch it with a warm burnisher. It will then melt and flow over the base of the cavity.

—*Gordon C. Barkley, Dental Science Journal of Australia.*

To Secure Pure Alcohol

In order to secure Ethyl alcohol (190 proof) for use by dentists‘ it is necessary to write the Prohibition Director of your state and request application blanks. You then fill out these blanks, return them to the Prohibition Director, who in turn forwards them to the Prohibition Commissioner at Washington, D. C.

When your application is approved by the Commissioner he issues a permit, which entitles you to purchase six quarts of 190 proof alcohol during any calendar year.—*L. V. Bowen, Oral Hygiene.*

Solder Reinforcement in a Gold Crown

To determine the exact amount of solder reinforcement in a gold shell crown where the bite is close, place a little flux wax in the shell. Heat the shell until the molten wax flows. Pieces of Watt's crystal gold may now be loosely packed in and the shell placed on the prepared tooth. The patient will be able then to establish comfortable occlusion. A little further condensation, with a plugger and sufficient solder to saturate, completes the reinforcement.

—*Steele F. Gilmore, Dental Facts.*

SOCIETY ANNOUNCEMENTS

Minnesota State Dental Association

The thirty-ninth annual meeting of the Minnesota State Dental Association will be held at the Minneapolis Armory on February 22nd to 25th, 1922.

C. H. Turnquist, *Secretary.*

Dental Protective Association

The Annual Meeting of the Dental Protective Association of the United States will be held at the Palmer House, State and Monroe Streets, Chicago, on the third Monday of December, the 19th, at 4 P. M. sharp. The report of the Officers will be given; a Board of Directors will be elected and such other business transactions as should come before the association.

All members are urgently requested to be present.

By Order of the Board of Directors.

J. G. Reid, *President.*
D. M. Gallie, *Vice President and Treasurer.*
E. W. Elliot, *Secretary.*

American Institute of Dental Teachers

The Twenty-ninth Annual Meeting of the American Institute of Dental Teachers will be held at The Windsor Hotel, Montreal, Quebec, on January 23, 24, 25, 1922.

An interesting program has been arranged built around the theme of Preventive Dentistry and its correlated subjects— What, When, How and Why to teach. There will also be a complete exhibit of scientific teaching apparatus, college equipment, etc.

All interested in dental teaching are cordially invited to attend.

Guy S. Millberry, *President*
Abram Hoffman, *Secretary-Treasurer*

381 Linwood Ave.,
Buffalo, N. Y.

The TOLEDO DENTAL SOCIETY

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SOCIAL

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CRITIC

L. L. Barber

It is the purpose of The Dental Summary to devote a Department to the doings of The Toledo Denta Society. Dr. W. W. Penske, Chairman Program Committe, has been appointed Reporter. All news of interest to the members should be reported to him. It is not necessary that the contents of the Department be confined to matters of serious professional or technical nature. Let's have it all, grave and gay. By working together we believe that we can make this section of The Summary of more than local interest.

The meeting at Commerce Club November 11, was one of the best attended for some time. Forty-seven sat down to dinner at 6:05. Both in point of numbers and promptness that's mighty near a record. If Penske succeeds in getting them in on time, he will deserve a medal made from old amalgam fillings.

The program was carried out as announced, except that the patriotic speaker failed to show up, probably being so full of patriotism that he missed the elevator. After dinner the entire evening was devoted to the demonstration of new goods made by The Ransom & Randolph Co., ably conducted by Dr. Guy T. Katner, and to a very valuable lecture by Mr. T. E. Moore, of the chemical laboratory. Mr. Moore's lecture will be published in this department later.

Look out, fellows! Brush up on your Roberts' Rules, and your parliamentary laws. Our critic is on the job. He asked for instructions at November meeting, and was given a free hand. A little more consideration along these lines will make our meetings a lot more interesting. It is just as easy to do things right as wrong. Let's learn to do things in good form, recognize our Chairman, and so on. It will do all of us good.

Drs. Welker and Hartshorn were re-elected to the Board of Trustees of the State Society.

Dr. L. L. Dull was elected to membership.

Bowling from 4:00 to 5:45. We understand that somebody rolled a score of 299, but haven't been able to find out just who the "professional" was. Let's have more bowling next time.

Dr. Walter Sargeant, orthodontist, has added another title to his string—Champion golf-player of the Toledo Dental Society. He wears all those old gold crowns in a medal, and it's SOME medal!

The society voted that members that had been automatically dropped for non-payment of dues might revive their membership by paying three years' back local dues, if dropped that long. If not, then by paying all back dues. Only local dues are included.

RESOLUTIONS ON THE DEATH OF OUR BROTHER MEMBER DR. A. C. MUSGRAVE:

Whereas, We, the members of The Toledo Dental Society, have by the call of the Creator, had one of our members, Dr. A. C. Musgrave, removed from among us, and,

Whereas, We desire to express our sympathies and sincere condolence to the friends and relatives in a fitting and suitable manner; therefore, be it.

Resolved, by The Toledo Dental Society, that in the loss of Dr. Musgrave from our midst, we all share the loss and that his family and friends have our sympathies in their great affliction.

And be it further resolved, That these resolutions be spread upon the minutes of this society and that a copy be presented to the family of the deceased.

L. L. SHEFFELD,
T. S. SHAW,
W. S. SARGEANT
—*Committee*

Toledo, Ohio, Nov. 15, 1921.

OBITUARY

DR. WILBUR BUZZELL, PORT CLINTON, OHIO

AT 9:30 Wednesday evening, November 2, following an operation for cancer of the throat at a hospital at Ann Arbor, Mich., there passed from earth and earthly association, Dr. Wilbur Buzzell, of Port Clinton, Ohio, one of the best known and best loved citizens of northern Ohio, in his seventy-third year.

Dr. Buzzell was born and raised in Michigan. He graduated from the University of Michigan in the dental department, but prior to that he graduated from the literary department, intending to teach, For a time he was a professor in a small college in New England.

Personally he was a charming man, and he loved and was admired, respected and loved by all who knew him. He arrived at all conclusions from a sense of honesty and right and he was above all things liberal.

He was a resident of Port Clinton for nearly 37 years. During all this time he practiced his profession and made countless friends. For 31 years he had charge of the music in the M. E. Church and he assisted in the development of many voices. He had a splendid baritone voice and he assisted in the singing at hundreds of funerals. His death has caused a vacancy that it will be hard to fill.

The body was taken to Port Clinton for interment. He is survived by his widow who has the sincere sympathy of all who had the honor of knowing Dr. Buzzell.

Two "brand new" Departments are to make their appearance in THE DENTAL SUMMARY with the January number, one a Department of X-ray Work, under the editorial direction of William A. Lurie, M. D., New Orleans, La., under the unique heading "Penetology," which Dr. Lurie offers as part of a new terminology offered by him as successor to the confused and often meaningless nomenclature heretofore employed. You will be interested in this department. Any questions that you may care to ask will be answered promptly and satisfactorily. Dr. Lurie is well known as a teacher of Roentgenology and all subjects that appertain to that branch of diagnosis, and is well equipped to handle his department in an intelligent, comprehensive and helpful manner. The other new feature will be found under the heading "Legal Department," and will be conducted by Mr. Elton J. Buckley, Philadelphia, Pa., a legal writer of note. One important feature of this department is that Mr. Buckley is prepared to solve your legal problems for you, on application, free of charge. Correspondence direct with him or through THE SUMMARY is invited, and costs you nothing. Subscribers to THE SUMMARY are offered free access to one of the best legal minds now writing for the public. Take advantage of this feature.

THE DENTAL SUMMARY does not offer premiums in order to induce subscriptions. If it is not worth its price, ten times over, you are welcome to it free of charge. THE SUMMARY is not in the merchandising business. It does not sell furniture, drugs, jewelry or books with its subscriptions. It stands upon its own merits as the one dental magazine that no dentist can afford to be without. But here are three things that it does offer its subscribers, entirely without charge or obligation of any kind:

Advice and assistance upon all professional and technical problems through its Service Department.
Advice and assistance upon all X-ray problems, practical or diagnostic, through its Department of Penetology.
Advice and assistance upon all legal problems, professional or personal, through its Legal Department.
Advice and assistance upon all business problems through its News and Opinions Department.

Anybody else like to read my papers on "Local Anesthesia in Dentistry," and "A Sane, Simple and Successful Method of Treating Pyorrhea" and kindred complaints? If so, all you need do is ask.

Alonzo Milton Nodine, D.D.S., of 8 West Fortieth St., New York City, has opened a London (Eng.), office, at 56 Manchester Street, Manchester square. London is now in position to learn something about the sort of American dentistry that was so much envied and commented upon during the War.

Forty-five hundred poor children were treated free at the Los Angeles school clinic last year. Despite such a record, a secret effort was made to abolish the clinic, which was effectually squelched by a decision of the Attorney General, U. S. Webb, who was decided that the clinic is to stay; that the Board of Education has a perfect right to employ dentists, physicians, nurses, etc., to examine and treat children and the work will continue as in the past.

In the meantime, brethren, I still believe that the greatly lengthened college course, so far as the rank and file is concerned, will prove to be an injury to the profession as well as to the laity. It is all well enough to extend the course to any length necessary to turn out the highly skilled specialist; but the demand for "just ordinary dentistry" is sure to outrun the supply within the next few years. It is well to be thinking about these things.

Dr. Lola Taylor, Birmingham, is said to be the only woman dentist in Alabama. She worked at a hotel during the first few months after opening her office to earn a living, while the curious merely looked into her office to "see what a woman dentist looked like." She is now said to be enjoying a good practice.

West Virginia school authorities report that the number of children having bad beeth is growing noticeably smaller, thanks to the work of the free clinics and dental dispensaries.

There are now known to be 286 established dental clinics in connection with the public schools in the United States.

Kleradesk
Clears Your Desk for Action
The Kleradesk automatically sorts and routes mail, memos, orders, etc., for all to whom mail is distributed. It holds reference papers out of the way but immediately at hand when needed.
A Steel Sectional Device
Add compartments as required. Sections $1.20 each. Six compartment model illustrated above $8.40. Indexed front and back. Write for free, instructive, illustrated folder, "How to Get Greater Desk Efficiency."
Ross-Gould Co.,
328 N. 10th—St. Louis (11)
New York, Chicago, Cleveland, Philadelphia

Do You merely Sell Teeth?

Do you deal with your patient over an invisible counter? Are you selling only materials?

IF these questions were asked *you*, of course your answer to each would be, emphatically "No", but many would have to qualify their answers. It will be a happy day for the profession when *all* dentists realize that teeth are simply *means* by which a *professional service* is rendered.

When artificial teeth are selected with the thought of using them to produce an efficient and artistic result, the matter of cost is a negligible factor. To the true professional man the choice of materials is based on quality and suitability rather than on price.

Trubyte

—the Teeth that supplement your Skill

After all, Trubyte teeth are the choice of the leading prosthetic specialists and of thousands of skilful, discriminating practitioners, because their use solves the big problem of appearance and makes possible for the many a quality of service only a few were able to approach in the past.

Character in form, naturalness in shading, convenience in graded sizes and a comprehensive range of moulds, distinguish Trubyte teeth.

If you would achieve a quality of service of which you may justly feel proud, you will choose only those materials which permit you to reveal your skill in concealing your patient's loss.

We are "selling teeth" — ***Trubyte*** teeth; ***you*** are rendering a professional service, and we take not a little pride in the fact that our product has helped and is helping you to improve that service.

RESTORATIONS T THAT RESTORE

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The **DENTISTS' SUPPLY COMPANY**

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DEATHS

At Peekskill, N. Y., October 25, Dr. Isaac Salkin, aged 25.

At Elkhart, Ind., October 24, Dr. Frank Greene Conklin, retired, aged 66.

At Trenton, Tenn., November 1, Dr. E. D. Vansyckel, aged 58. He formerly lived at Canton, Ill.

At Marlboro, Mass., November 7, Dr. Oscar H. Stevens, aged 67.

At Brooklyn, N. Y., November 7, Dr. George F. Huntington, aged 45.

At New Castle, Ind., October 25, Dr. P. L. Beal, aged 60.

At Augusta, Ga., October 22, Dr. Joseph Whitlaw, was accidentally killed by the discharge of his shotgun while hunting.

At Philadelphia, November 1, Dr. Edward W. Barton died of heart failure while treating a patient.

At Bristol, Tenn., October 1, Dr. J. M. King, aged about 70.

At Lebanon, Pa., October 19, Dr. Edward Payson Kremer, a leading dentist of the state and well known as a magazine writer, aged 72.

At Port Chester, N. Y., October 17, Dr. Charles H. Thimme, aged 73.

At Nantucket, Mass., Dr. Eben M. Flagg, representing the government of Paraguay in this country. He was widely known as the inventor of dental instruments.

At Brooklyn, N. Y., Bedford Section, Dr. John A Schmidt, aged 57.

Somebody Should Smile

Reading in an eastern paper that a dentist charged a man $230 for extracting a wisdom tooth, a Milford friend has puzzled over the bill, and finally handed in this itemized statement, which he thinks must be about the way the dentist figured it out: To shaking hands with patient, $10; to making observation about the weather $7.50; to asking which tooth it is, $2.50; to promising not to hurt, $25; breaking promise, 75c; to strangling patient with towel, $8.75; to getting out tools and looking them over, $11; to noticing they were the wrong tools, $8; to stepping out of the room and using the telephone, $7.40; to washing hands and telling funny story, $5.25 to administering anesthetic, $10; to extracting wrong tooth, $5. And my friend says that he merely figured it up to show that there is profiteering in every kind of business except the kind of business in which you yourself happen to be engaged.

Dental Assistant Wanted by U. S. A.

The United States Civil Service Commission announces an open competitive examination for dental assistant. Vacancies in the Public Health Service throughout the United States at $80.00 a month without quarters, subsistence, and laundry, and vacancies in positions requiring similar qualifications, at this or higher or lower salaries, will be filled from this examination, unless it is found in the interest of the service to fill any vacancy by reinstatement, transfer, or promotion.

Appointees whose services are satisfactory may be allowed the increase granted by Congress of $20 a month.

All citizens of the United States who meet the requirements, both men and women, may enter this examination; appointing officers, however, have the legal right to specify the sex desired in requesting certification of eligibles.

On account of the needs of the service, papers will be rated as received and certification made as the needs of the service require. In the absence of further notice, applications for these examinations will be received by the Commission at Washington, D. C., until the hour of closing business on January 31, 1922. If sufficient eligibles are obtained, the receipt of applications may be closed before that date, of which due notice will be given.

Applicants must have successfully completed at least sixth grade of common school.

Applicants must have reached their eighteenth but not their thirtieth birthday on the date of the examination. These age limits do not apply to persons entitled to preference because of military or naval service.

The necessary certificate or other evidence to establish claims made must be filed with the application.

Classified employes who have reached the retirement age and have served fifteen years are entitled to retirement with an annuity. A deduction of 2½% per cent. is made from the monthly salary to provide for this annuity, which will be returned to persons leaving the service before retirement with 4 per cent. interest compounded annually.

Applicants must submit with their applications their unmounted photographs, taken within two years, with their names written thereon. Proofs or group photographs will not be accepted. Photographs will not be returned to applicants.

Applicants should at once apply for Form 1312, stating the title of the examination desired, to the Civil Service Commission, Washington, D. C.; the Secretary of the United States Civil Service Board, Customhouse, Boston, Mass., New York, N. Y., New Orleans, La., Honolulu, Hawaii; Post Office, San Francisco, Calif., Denver, Colo.; Old Customhouse, St. Louis, Mo.; Adminstration Building, Balboa Heights, Canal Zone; or to the Chairman of the Porto Rican Civil Service Commission, San Juan, P. R.

Applications should be properly executed, *including the medical certificate*, but excluding the county officer's certificate, and filed with the Civil Service Commission, Washington, D. C., without delay.

The exact title of the examination, as given at the head of this announcement, should be stated in the application form.

Indiana—Thirteenth District

Goshen, October 20—A real "Children's Session" of the Thirteenth District component of the I. S. D. A. was held here today, the field being completely covered from prenativity to adultship. F. B. Rhobotham, Chicago, handled the subject: "Dental Considerations from Foetal Life to Adolescence." He was followed by Dr. D. A. Elwell, of Toledo, on "The Management of Children and Treatment of Temporary Teeth." Dr. Frank A. Hamilton, Indianapolis, concluded the program with "The State Association Position in a Dental Survey of Children." The program was followed by a fine chicken-dinner and entertainment, which included the ladies, and was a most enjoyable affair. The officers of the Society are: President, W. O. Vallette, Goshen Ind.; Vice-pres., G. F. Hitchcock, Plymouth, Ind.; secy., Von L. Kennedy, Elkhart, Ind.; treas., Geo. W. Menges, Elkhart, Ind.

Classified Advertisements under this heading, $2.00 each for 60 words or less; additional space 2 cents per word, single insertion; three insertions or more special rate on application.

FOR RENT—Three steam heated rooms newly furnished and adaptable for dental rooms. Location in a prosperous town of 14,000. For further information write, L. C. Hall, Owosso, Mich. 1201-P

WANTED—A dentist for permanent position in X-ray laboratory. State experience, salary expected, etc. Address Box 1230-C, THE DENTAL SUMMARY.

FOR SALE—American Cabinet No. 58 Quartered Oak. Elgin Casting Appliance, new. Other dental material. Write to Capt. Clyde W. Allen, State Hospital, Columbus Barracks, Ohio. 1220-C

RICH ALLOY

Trade Mark

Dental Casting Gold and Solders

Formulae of DR. JOHN F. STEPHAN, Cleveland, Ohio.

Inquire about our No. 2 CAST CLASP METAL.

For Sale by Dealers

RICHARDSON RESEARCH LABORATORIES

Refiners and Workers of Precious Metals - - CLEVELAND, OHIO.

SAL HEPATICA

MATERIALLY AIDS

Local Treatment in

PYORRHEA

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New York

LISTERINE

TOOTH PASTE

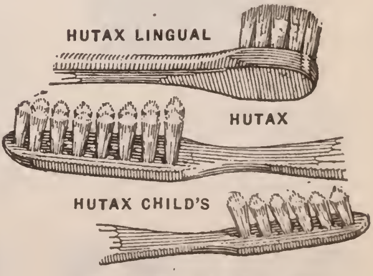
Composed of an unusually efficient neutral cleansing and polishing substance, flavored with the essential oils which impart to the antiseptic solution Listerine its agreeable odor and taste—slightly acidulated with a pleasant fruit acid which deters formation of "tartar" about the teeth and provides mild salivary stimulation.

HUTAX TOOTH BRUSHES

"Hutax" means Mouth Health

We have been appointed United States distributors for these brushes, which were designed by a Committee of Dentists of the International Oral Prophylactic Association. All profit accruing to the Association from their sale is expended for research or education.

The Hutax brush, used in conjunction with the Hutax Lingual brush — which is particularly suited to cleansing the inner surfaces of the incisors, regulating appliances and bridge work—provide the most approved means of tooth brushing. Particulars gladly furnished on request.



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Williams Ready-made Clasps. Seamless, reversible, one-piece ready-made. Made from a tough high-grade alloy of gold and platinum.

GOLD has been gold since the World began but for years and years, Williams has been putting that *something* into it which dental folk call service and satisfaction.

There are often several qualities which would be desirable in a dental gold—but some qualities can be developed only at the sacrifice of another quality. Because we know just how far to develop each so as to produce the best possible "balance"

WILLIAMS

Date Due

7/25/31